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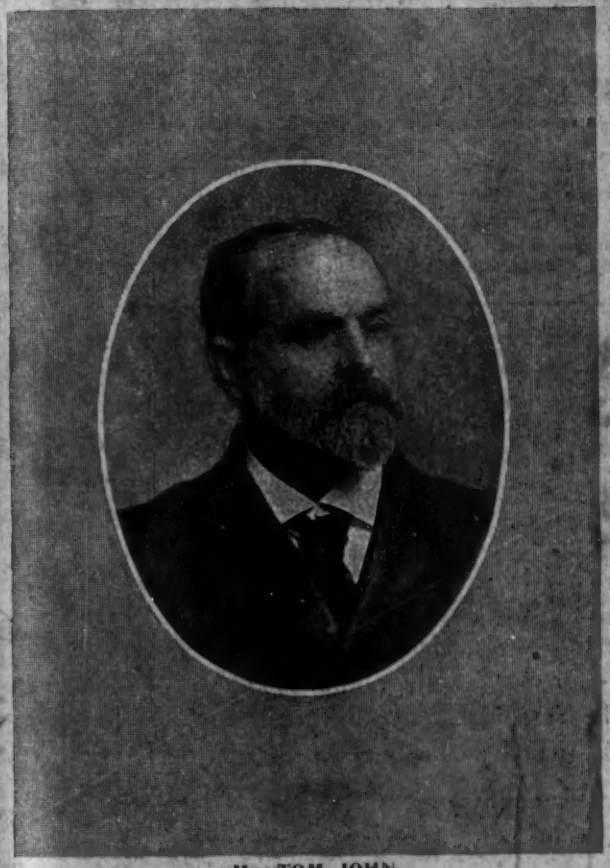

Mr. TOM JOHN

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THE

PRACTICAL TEACHER

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EDUCATION IN PARLIAMENT.

BY fourteen to twelve, or seventeen to fifteen, or some such enormous majority in a crowded House like that, the Peers have refused to accept the Bishop of Hereford's Evening Continuation School Bill. Lord Londonderry himself, the learned and magnanimous head of the Board of Education, would have none of it; it meant a longer school life, either at day school or night school, for working-class children, and the Peers, conscious of how little they learned and how seldom they worked at Eton or Winchester, do not see why working-class children should be schooled any more than they were themselves.

In point of fact, the Peers do not greatly care for the Bishop of Hereford. He rises amidst them a tall, ascetic, and saintly-looking prelate, with the face of a Cardinal Newman or the late Pope, and the Peers begin to feel uneasy at once. Wasn't he a schoolmaster—Rugby or somewhere—Rugby, Tom Hughes, Tom Brown's Schooldays, Dr. Arnold, and all that? Looks it, doesn't he? Talks like it, by Jove! Regular pedagogue, if not a pedant! Makes a fellow feel uneasy; kind of man who looks too good for this world, even for the Upper Chamber of Parliament in the first country and greatest Empire of this world. Let's go out—let us converse about shootin' or huntin' or goff. What, he's still goin' on! Oh, vote the thing out and ha' done with him! Such is the attitude of the dissentient Peers, but there is a good deal of worldly wisdom and human nature about it, after all. The Bishop's Bill was, no doubt, a little drastic and previous, and, like a too precocious child, it is dead; its decease was prophesied here last month.

In an accent which is credibly reported to belong to certain parts of Glasgow, Mr. C. Scott Dickson, K.C., M.P., the Lord Advocate, introduced the new Scottish Education Bill, under "the ten minutes' rule," and occupied fifteen minutes in doing it. Short, that, for a Scotch sermon; and like a sermon it sounded, the dry, mirthless, serious, but thoroughly sensible and business-like speech of clear exposition which he made. The Opposition listened benevolently, and said "Amen!" or words to that effect. Mr. Scott Dickson has not the airs and graces of the lamented Graham Murray (who was a George Wyndham in a kilt, so to speak), but all the same he is an estimable and educational person, of whom West Scotland may be proud. With great wisdom he has made alterations in those parts of last year's Bill which roused to wrath and derring-do the champions of the country parishes in the matter of bawbees; and if this Parliament lives long enough the Bill may get through. Writer to the Signet Black, however, with fell design, proposes to move the House to commit the Bill to a committee of Scottish members only, and an insidious stroke for Home Rule is suspected, and perhaps intended, in that Party politics, alas, bedog the subject of education in Parliament.

Politics are not unmixed in the chief topic of educational debates in the House of Commons this session so far; to paraphrase that topic, it has been, "Is a school an eating-house, and if not why not, and if it is, why is it not so actually, and if it can be, when can it be, and if it can't, why can't it?" That is what the faithful Commons have had for dessert after luncheon day by day. Sir John Gorst and Dr. Macnamara have dished up, and stirred up, and served up that subject piping hot almost daily. They have stood like Mrs. Squeers and Fanny, brimstone-and-treacle basin and gravy-spoon in hand, dosing the Ministers with the Deterioration and Foodlessness of the young. They have given Sir William Anson several spoonfuls weekly. They have administered the healthful mixture to Mr. Gerald Balfour, who consequently curses the hour when he became President of the Local Government Board. Bland Mr. Akers-Douglas, as Home Secretary, has had to take his gruel. The Prime Minister himself has been brimstone-and-treacled by the relentless Gorst and the ruthless Cam-

berwell. And whenever a Minister has refused the dose he has been subjected to two spoonfuls in the end, instead of one.

Never was seen such a campaign; never was known such a time. And the House of Commons has sat by quietly, not rising in its wrath and squelching the gruellers, because—but this is where politics comes in. What member of Parliament who proposes to submit himself for re-election, at a date which may be the day after to-morrow (for nobody can tell), likes to be marked down and black-listed as an enemy to the feeding of starveling children? And the Trade Unions, those powerful electioneering bodies, have begun to take the proposal up. Also the Socialists. Also some of the regular and steady Liberals. Also some Tory Democrats. Hon. Claude Hay, M.P., Tory Democrat, brings in a Bill to feed the school children at the schools out of the public purse to begin with; Mr. Henderson, Labour member, brings in a similar Bill; Mr. Keir Hardie, Socialist, rises and socialises. And Sir William Anson pales, shrinks, and becomes so small as to be next door to invisible. He wishes he *was* invisible when Sir John Gorst wags his frosty pow at him, or Dr. Macnamara shakes the fist of wrath. Mr. Gerald Balfour's face has a capacity for exhibiting internal feelings of disapprobation and disgust, but must he allow his face to betray his sentiments? Politics forbid!

So the great Refectory question goes forward, propelled by Dr. Macnamara and Sir John. Mr. Gray and Mr. Yoxall sit silent; they may sympathise or they may not—nobody can tell. Certain Members—politics makes it impolitic to name them—are believed to believe that the schools and the teachers are busy enough already, without new and different duties being imposed; that the education rates are high enough already, without part of the function of the poor-rate being transferred to them; and that the cry and pother about the physical deterioration of children are overdone, and little founded; yet—a General Election is not far.

Dosed with brimstone-and-treacle, Sir William Anson is slumbering out of sight behind the Speaker's chair one afternoon, when, unexpectedly, the doughty and rectangular Mr. George White of Norwich, ex-President of the Baptist Union, attacks him in a fresh spot. Secondary schools. Ha! something really educational, after all! Prodded and poked about the Secondary Education Code, Sir William turns for comfort to the benches behind the Treasury Bench, and alas! what there does he see? The cold and calculating eye of Mr. Cripps, K.C., M.P., honorary counsel to the Church Schools Emergency League, is fixed upon him, and the fair white head of Sir John Gorst rests against the green morocco, ready to be lifted like an oriflamme, the white-plumed helmet of Navarre, if only the Church Emergency warriors get a chance. What, shall Sir William continue to forbid Church children to be carried to Church by devout Churchmen on Church saints' days? Saints forbid! Mr. Cripps and Sir John wait their chance.

Sir William gasps, but there is just one ray of hope for him; the debate must end at seven of the clock, and on the dial the hands are pointing to six o'clock already. The guillotine will fall at seven, on the Appropriation Bill — so-called because upon it you may discuss appropriate or inappropriate subjects at your own sweet will. Mr. White is keeping on about governors, and minimum fees, and free places, doing a valuable piece of work for education by exposing the high-and-dry Secondary, Charity-Commission, anti-Democratic ideas in the Secondary School Regulations of the Board. But he sits down, and for a moment Sir William Anson trembles. Will the Cripps or the Gorst seize the moment and attack? But no, Dr. Macnamara is up, and with a positive joy that it isn't Mr. Cripps calling him a renegade Churchman, Sir William hears Dr. Macnamara accuse him of gross impertinence in the Regulations, which ought not to cramp the discretion of local authorities at all. Sir William smiles; gross impertinence, obvious incapacity, anything—anything rather than the Cripps, the saints-days, the Church Emergency League, and the Gorst.

Dr. Macnamara expounds to the listening Labour members how this retrograde Board of Education is spoiling municipal schools for the working-man's clever child, but having made his three heads and an application he sits down, and Sir William gasps again. But no, saved once more! Mr. Kearley is up to sandwich in an inquiry from Captain Pretyman about a dockyard-man's sick allowance and compensation, and when that is finished Sir William feels that he may rise to speak and so himself keep the Cripps and the Gorst at bay. In a dry, inelastic, donnish little speech, which rattles like peas in a last year's peascod, Sir William defends his Department and the Regulations, with an unyieldingness and absence of grip, insight, and sympathy, which irritate even Mr. Yoxall, patient man! Mr. Yoxall rises, at three minutes to seven, tells Sir William that he (Sir William) knows nothing about the subject on which he has been talking, accuses him of giving a totally unsatisfactory reply, and as a protest moves that the Bill be read that day six months. Does Sir William care? Not he. For hooray! the clock is on the stroke of seven, and the Church Emergency Leaguers are gagged the moment the guillotine falls; indeed, seeing that their chance is gone, the Leaguers have gathered up their canons and prayer-books and are departed—to church, no doubt.

But can Sir William Anson go to sleep again? No, he must keep awake and alert. Welsh members buzz about him like wasps. "Merioneth!" is the cry and shibboleth. What, is the local authority for Merionethshire to be defaulted after all? Even as late as eleven o'clock at night, up in a committee-room, Sir William must meet the Welsh members face to face. The Marquis is there, Mr. Morant is there, Mr. Brynmor Jones, K.C., M.P., is there, Mr. Bryn Roberts, K.C., M.P., is there, and there is historical talk about the spirit and patriotism of Merionethshire in the fourteenth century. "Come to more modern times," the Marquis says. But the Welsh invoke the days of old—

> "And shall Merioneth die?
> And shall Merioneth die?
> There's fifty thousand Chapel schools
> Shall know the reason why!"

is chanted in the corridor—or words to that effect. Taffius defies Tarquinus Superbus—down with the tyrant Marquis—to the Church Emergency Leaguers with the little man of the Admiral's name! Sir William hears that awful threat, flees the Leaguers, and meekly takes his brimstone-and-treacle again.

These be the humours of Education in Parliament in the month of April—from the first of it onward—during the session of 1905.

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"Quot homines, tot sententiæ."

N.U.T. NOTES.

FOR many years, the Organisation Committee of the Executive have pursued the policy of trying to catch the Unionist whilst young. The rules of the N.U.T. provide that applicants for admission must pay an entrance fee of five shillings; but no such fee is demanded from any teacher joining the Union either (1) on or before November 20th of the year in which the Certificate Examination is passed; or (2) at a later date, if such later date fall within the three months immediately after the date upon which the teacher commences work in any school. As a further concession, teachers newly certificated may be admitted until November 20th of the same year at one-half the ordinary subscription; and, in order to encourage the local Associations to enrol the young qualified teachers, the whole of these half-subscriptions are, by resolution of the Executive (though not under the rules of the Union) retained in the local exchequers. Annually, the Union's missionaries go forth to the training colleges to spread knowledge concerning the N.U.T. and its work, and although in rare cases unsympathetic Principals may decline the offer of a Union deputation, in nineteen instances out of twenty the greatest cordiality and friendliness await the chosen speaker. Since becoming a member of the Executive I have visited residential colleges for men only and women only; day training colleges for both men and women; and recently it was my great privilege to journey to the Cambridge University Day Training College to address the undergraduates destined for the rôle of Orbilius (not necessarily *plagosus*). Mr. Oscar Browning, M.A. (Principal) and Dr. Fletcher (Vice-Principal) are both members of the Union, so I felt almost like preaching to "the converted." I was glad, however, to meet the bright young fellows under their charge, who are scattered through the various Colleges, and take the customary University courses in addition to pursuing their professional and pedagogic studies. A return just issued of all the students who have passed through the Day Training College shows that in the main they take exceedingly good degrees, far better in fact than the average student, the whole of whose ante-University life has been devoted to self-culture. I confess that I heaved a half sigh because day training colleges connected with one of the older Universities were not, in my younger days, even on the horizon of educational "practical politics."

A Visit to Cambridge.

THE new Executive will meet without Mr. J. F. Blacker, a gentleman who has been very much to the front during the past dozen years. His period of office as ex-President terminated with the Llandudno Conference; and although he announced his intention not to seek re-election to the Executive over a year ago, it was always open to him to change his mind—"at the urgent request of some hundreds of teachers to reconsider his decision" is, I believe, the polite way to phrase it—and stand again. However, he has adhered to his original determination, and *ça va sans dire* that he will be greatly missed at Russell Square. My earliest recollection of him was at the Oxford Conference of 1894, when, with a sublime persistency, he kept on asking a variety of questions on the report and balance-sheet of the Union. To the Executive of that day he must have appeared an unmitigated nuisance, yet his habit of probing things to the very bottom was entirely commendable. Earlier on in the same year, he had been the leading spirit of the Brighton teachers in a hard-fought School Board election, which resulted in the return of the late Mr. Baseden—a teacher most unfairly and cruelly dismissed by the Brighton School Board—at the top of the poll. Mr. Blacker's grit and determination in a local struggle placed him on the Executive of the Union, where such qualities are particularly needed. For some time he was chairman of the Parliamentary Committee, only relinquishing this honourable position to take up the still more distinguished office of Vice-President of the Union. As President, he was a thorough success, performing his arduous duties with a zeal beyond praise, for it must be remembered that during his year of office he was frequently suffering paroxysms of the most excruciating physical pain. He was a speaker of the strenuous type, equally at home in French and English. In every phase of Brighton life he was well known, and municipal politics, sport, art, and letters all claimed a share of his extraordinary energy. He did one thing especially for which all succeeding N.U.T. Presidents are profoundly grateful. He "struck" at the traditional form of "illuminated address" on vellum, and was the means of introducing a new type of address which is really "a joy for ever." He has relinquished his profession for "business"; and it is significant that of the series of Presidents of which he was the tenth *only two*—Messrs. Ellery and Jackman—are to-day to be found in school!

Mr. J. F. Blacker.

AMONGST the many interesting paragraphs in the 28th Annual Report of the Central Council to the subscribers occurs the following:—

> "The Council, too, desire to gratefully acknowledge the whole-hearted manner in which the teachers of Wales generally have responded to the claims of the Conference effort, and they record with pleasure that, up to the end of December, the grand total raised has reached £3110, 13s. 8½d. When it is remembered that the amount raised in Wales for 1903 was £874, 2s. 7d. the great work done during 1904 is evident."

The "B. and O." Fund.

The gallant little Principality has celebrated in the best of all possible ways the holding of a Welsh Conference under a Welsh President, and an average amount of 15s. 10d. per member (from 3925 members) is something of which Mr. Tom John and his *confrères* will ever be proud. This amount of 15s. 10d. is easily first amongst the various districts for 1904, and falls but sevenpence below the North Midlands record of the previous year, gained, it will be remembered, through the colossal effort of the Nottingham Association, which resulted in a purse of £2336, 6s. 5d. Until quite recently, the onus of raising funds for charitable purposes rested largely with the Conference town.

Many of us held the opinion that this was a burden and responsibility which should not be borne; and, although district efforts are eminently laudable and praiseworthy, it is most gratifying to see that, to-day, all parts of the country are doing their share of the noble work. The following table will interest all who love statistics, showing, as it does, the average amount raised per Union member in the various electoral districts, during the past three years:—

No.	District.	1902.	1903.	1904.
		s. d.	s. d.	s. d.
1.	North England . .	13 6	4 10	4 6
2.	Lancashire . . .	6 1	6 2	7 2
3.	Yorkshire . . .	9 1	4 1	4 0
4.	North Midland . .	12 6	16 5	4 9
5.	South Midland . .	5 7	5 0	6 5
6.	East Anglia . .	3 10	3 4	7 1
7.	South England . .	4 8	10 5	12 0
8.	West England . .	6 3	4 0	4 2
9.	Wales	5 1	4 8	15 10
10.	North London . .	3 8	4 0	4 8
11.	East London . .	5 2	5 0	4 9
12.	South London . .	5 0	4 7	5 4

In eight of the electoral districts the average amount raised per member has increased during the year. The number of local Boards that have sent up *less than one shilling per member* is 25, as against 59 for 1903; whilst the number that have sent up *five shillings or more per member* is 159, as against 137 for 1903. All-round progress of this description may well gladden the hearts of those who love their kind.

* * *

The "T.P.S."

"*INVESTED Funds exceed* £180,000. *Annual Income exceeds* £60,000. *Total Membership exceeds* 11,800. *New Members in* 1904, 2057." These striking figures amply demonstrate that the Teachers' Provident Society is growing both in numbers and importance, and that far from being "the little pettifogging club" of some of its detractors, it has developed into one of the soundest and most valuable branches of Union activity. Its Board of Management is composed of energetic, resourceful, capable business men (assisted by *one* woman, Miss S. E. Jobson, member of the N.U.T. Executive), whilst to say anything in praise of its secretary, Mr. A. Golding, would savour of painting the lily or gilding refined gold. But an energetic secretary and an alert Board of Management cannot do *everything*, and I am glad to observe that, in "Quarterly Notes," full recognition is given to the devoted labours of the local secretaries and their willing helpers. No less than 1938 out of the 2057 new members were brought into the Society through their exertions, and in according to them the heartiest thanks, the Board of Management ventures to hope that they will not rest on their oars in 1905, nor allow their labours in any way to flag. Leeds holds the premier position with 84 new members, and East Lambeth 81, Chelsea 79, and Finsbury 76 follow closely behind. These are all large agencies with a numerous clientèle upon which to draw, so naturally considerable results are expected from them. Certain of the smaller agencies have done, proportionally, even better things; and Newcastle-on-Tyne, which has raised its membership from 18 to 40, Preston from 8 to 26, Gillingham from 23 to 40, Hornsey (a new agency this year) from 49 to 83, and Willesden (another new agency) from 21 to 45, all deserve congratulations on their signal success. Possibly the most important proposals submitted at the annual meeting of the members on Easter Monday are those relating to the Officials' Pension Fund, and although these lines may not be published until after the decision is taken, I have no kind of doubt as to what the upshot will be. For a long time past it was felt by members of the Board of Management (and the statement is made authoritatively by its talented chairman, Mr. F. C. Blackburn) that the relations between the Society and its office staff would not be completely satisfactory, until to adequate remuneration and comfortable conditions of employment was added a system of retiring allowances to round off the period of active service. Probably the cordial fashion in which the Portsmouth Conference agreed to the provision of a Pension Fund for officials of the N.U.T. helped to bring this vague feeling to a head. The proposal to assign yearly retiring allowances of £180 to the assistant secretary and £75 to the senior clerks has both justice and expediency to recommend it.

* * *

Honouring Mr. Sharples.

TO give a man a "Complimentary Dinner" seems to be a favourite and peculiarly British method of showing him honour; and certainly the custom has much to recommend it. *Experto crede!* and having been personally entertained in this fashion on some half-dozen occasions—to say nothing of being the guest of the Scottish Class Teachers' Association at a complimentary luncheon held in Glasgow under the chairmanship of Sir John Stirling-Maxwell, M.P., a distinction, by the way, which I particularly prize—I know something of the inner feelings of "Our Guest." Few men who attain to any eminence in the Union are allowed to go unfêted; and it was with peculiar pleasure that I read the account of the memorable function held under the auspices of the Battersea Club, at the Holborn Restaurant, in honour of Mr. George Sharples and his charming wife. My one regret was that an engagement entered into long before the date of the dinner was announced compelled me to leave London early on the selected day. It is exceedingly difficult to speak or write of Mr. Sharples in everyday terms; and, in the case of the *Practical Teacher's* readers at all events, it would be a work of supererogation, so familiar must they be with his merits. He who would expatiate on his good qualities is confronted with a veritable *embarras de richesses*, and I might make a long story short by acknowledging that my sentiments regarding the retiring President of the Union concur exactly with those expressed by the writer of the exhaustive sketch of Mr. Sharples, published in this journal on the eve of the Portsmouth Conference. He has more than fulfilled the expectations and anticipations of his countless friends and admirers, although those were of the highest degree; and he will go "into winter quarters" with the proud consciousness that he can transmit undimmed to his successor the record and traditions of the highest distinction that the teachers of this country can accord.

A. C.

THE "Moscow Commercial School" of which we gave an account in our February issue, has been honoured by the title of the "Imperial Commercial School," being the first and only commercial school to which this distinction, a great one in Russia, has been accorded.

NOTES FROM THE NORTH.

THE Fifth Biennial Congress of the Scottish Class Teachers was held this year in Glasgow on March 24th and 25th. The attendance at all the various functions was most gratifying, and everything passed off without a hitch. The President, Mr. Alex. Small, F.E.I.S., Glasgow, gave a most interesting and exhaustive address. In the course of his remarks he called attention to the evil of "over-inspection." As teachers, he said, they did not object to inspection. Many must admit with all sincerity that they have derived benefit from the visits of Inspectors, who, with a true appreciation of their position, were not so much concerned with percentages of passes as with the spirit and tone of the work done. Thring has said, "*Teaching* is not possible if an inspector is coming to count the number of bricks made to order." Mr. Small thought he might have added with equal truth that the teacher had a higher and nobler work to do than to make bricks to order. He felt that one of the temptations which would beset the school authorities for the enlarged areas set forth in the new Bill would be to appoint officials to oversee and estimate, at least in a fashion, the work done in their schools. It was fitting, therefore, he said, to point out that the Department already discharged that duty quite adequately through the medium of His Majesty's Inspectors, with whom, in the main, they had no complaint, save that, perhaps, there were too many of them—and too many of them young. There was no need, he felt, for the appointment of local inspectors, and there was a positive harm in doing so which outweighed any possible advantage in the direction of a fairer system of classification or promotion. The knowledge that one may at any moment be visited by His Majesty's Inspectors for ordinary school work, His Majesty's Inspector for Physical Training, His Majesty's Inspector for Drawing, for Music, His Majesty's Inspectress for Cookery, a School Board Inspector for each of the above subjects, was the cause of a feverish excitement and nervous strain and anxiety in teaching which was bound to have a harmful influence upon the nature of the work done. He welcomed reasonable inspection, but he believed that too much inspection by too many experts created an unnatural atmosphere in which to carry on the work of a school. Not only so, but it tended towards an undue interference with methods of teaching in an untenable desire for uniformity. He called it untenable, because, as teaching was not a mechanical art but had to do with the mind and spirit, methods of teaching should not be fixed, but flexible and fluid, and in all intelligible and effective teaching principles rather than rules should be held at a premium. There is little doubt that Mr. Small's remarks are more than called for at the present time, as we are rapidly approaching the time when inspection will become an "intolerable strain," if we have not already reached that time.

Class Teachers' Congress.

NO conference of teachers in Scotland at the present time can go far in its agenda before some reference is made to the present Bill. It therefore fell to Mr. H. M'Callum, the first President of the Class Teachers, to move a resolution on the subject. The motion was as follows: "That this Conference approves of the main provisions of the Scotch Education Bill now before the House of Commons, and would urge Scotch members to facilitate its progress through Parliament." In submitting the resolution Mr. M'Callum expressed the opinion that it was a better Bill than that of last year. The enlarged area would, he thought, bring in its train many advantages. It would enable Educational authorities to co-ordinate education and to make it possible to construct something like an educational ladder which would lead from the humblest education to the University. He welcomed the proposals in regard to Provincial Councils. Last year these proposals were placed at the end of the Bill, and they were told that they were not an essential part of it. This year, however, they were put in a better position, and were much better drafted. Dealing with the proposals with reference to the Education Fund, he did not think that the Government had yet found a solution which would commend itself to the great majority of the ratepayers of Scotland. As teachers, however, it had been said that that was not a matter which really concerned them, and the question could well be left to the ratepayers to settle among themselves. But if the provisions were carried as they stood, many progressive Boards would be penalised for their forethought and educational zeal. The paragraph which proposed to restore to School Boards the power which was unjustly taken from them in 1898 by the passing of the Superannuation Act—the power of supplementing the pension of teachers who were in service before 1898 was, he thought, a modest proposal, but they hoped there was in it a very great germ of good. Mr. S. M. Murray, Organising Secretary of the Institute, seconded the motion, which was unanimously carried.

The Education Bill.

AS the septennial period for revision of the Superannuation Act of 1898 approaches, there is an evident desire on the part of the teachers of Scotland to leave no stone unturned with a view to having great improvements made on it. Mr. Fenton, Aberdeen, in an able speech proposed "That this Congress is of opinion—(*a*) That the superannuation allowance to teachers as determined by the Act of 1898 is utterly inadequate, and is not a fair equivalent for withdrawing a teacher's certificate; (*b*) That the Act should be entirely revised, and its provisions made analogous to those relating to other branches of the public service." In supporting this resolution, Mr. Fenton said that only a few weeks ago he heard an eminent citizen of Aberdeen describe the superannuation scheme as the scoff of every policeman who walked the streets. Teachers themselves had characterised it as contemptible, miserly, mean, beggarly; and every corporate body which had had under consideration the advisability of formulating a scheme of superannuation for their servants, has regarded the Teachers' Superannuation Act of 1898 as a perfect target for the shafts of their ridicule. Business men, who are entirely unaffected by the Act, and who are therefore in a position to look at it calmly and judicially, are a little less extravagant in their terms, and sum up its weak points in these words: (1) The provision it makes for the teacher himself is inadequate even for personal purposes, and is far from being a fair equivalent for the termination of his ordinary income; (2) No provision whatever is made for his dependents

Superannuation.

—the superannuation allowance being absolutely bound up with his life, and contingent on his arriving at the age of sixty-five. By carefully prepared statistics he showed by comparison between the much-belauded scheme of 1898 and schemes promoted by clear-thinking, level-headed business men, how inadequate was the provision made for teachers. In every one of the latter cases he found the age of retiral sixty, the disablement allowance to be greater than that granted by the Government, and the superannuation allowance to be two-thirds of the maximum pay. The rate of contribution, where contribution was asked for, was generally two and a half per cent. of the pay, an amount doubled by the employers, and returned in full to the representatives of the employed in the event of death occurring before the age of retirement.

MR. FENTON took his own city as an illustration of some of the inequalities of Government pension schemes. On looking up the Civil Service Superannuation and Retired Allowances for 1904–5, he found the following reference to Aberdeen. The Governor of Aberdeen Prison, with a salary of £425, 4s., is relieved after thirty-seven years' service with a pension of £281, 5s.; a chaplain of the same place, with a salary of £149, 6s., is retired after ten years' service with a pension of £67, 3s. 8d.; and a warder with a salary of £103, 14s. 7d., is retired after thirty-four years' service on the ground of ill-health on a pension of £58, 15s. 6d. Just about eighteen months ago a teacher was retired in Aberdeen, after nearly fifty years' service in his profession. High positions in every one of the learned professions are filled by his pupils; some are commanders of the finest vessels that leave the ports of Britain; not a few are renowned in lands beyond the seas; his own sons, university graduates, and one, at least, a distinguished alumnus of Aberdeen and Cambridge, hold posts of honour on the frontier of the British empire in South Africa. Yet the Government rewarded him with a pension of £30, the largest that could be accorded under the old regulation. An intimate friend of Mr. Fenton's, before accepting the Act, wrote the Department asking the amount of pension that would be bestowed on him on reaching the age of sixty-five. The reply was not comforting—"about £19." He is a graduate of the University of London, and in receipt of a salary of £200. Yet the charwoman of the Home Office is retired, after twenty-three years' service, with an allowance of £14, 1s. 6d.

Comparisons.

THE time at the disposal of the Conference was so limited that discussion on the various resolutions was almost entirely prevented. It was a thousand pities that such was the case with reference to the very comprehensive resolution on Continuation Schools. There can be little doubt that this subject has during recent years received very scant consideration at the hands of the Department. Red tapeism here has simply run riot. The amount of clerical work demanded from the head teachers of these schools is appalling. There is a crying need for the subject being thoroughly taken up by the Class Teachers' Association and the Institute. The resolution proposed by Mr. G. McKay, Falkirk, was as follows: "That this Congress, while cordially recognising the improvement made by the new system in continuation schools, is of opinion (*a*) That, where pupils have left the day schools, without having passed the qualifying or an equivalent examination, attendance at a continuation school should be made compulsory until the age of sixteen; (*b*) That, subject to the approval of His Majesty's Inspector on his first visit during the session, the "qualification" for admission to classes in Divisions II. and III. should depend entirely upon the report of the headmaster as to the ability of the student to profit by the instruction provided; (*c*) That the study of individual subjects should receive more encouragement; and (*d*) That a satisfactory definition should be given of what is recognised as 'a practical subject.'"

Continuation Schools.

AS noted above, this part of the new Education Bill has been moved forward, and now takes precedence of the Education (Scotland) Fund. Several important alterations have been made in this paragraph of the Bill. The main change to be noted is that the training of teachers now falls with the purview of the Councils, and it would appear as if the Training Committees to be established by the recent minute were to be merged in the Provincial Councils. St. Andrews takes the place of Inverness. Other local authorities, as it was put in the first Bill, are now to have no representatives in the Council. The Department, too, does not claim to appoint one of its own officers as secretary. But perhaps the most important change is that the four Provincial Councils may form a joint-committee for the purpose of deliberation and consultation. There is here the possibility of great practical usefulness. It will serve as the nucleus of a National Education Council, to which will be entrusted in large measure the future destinies of Scottish education. The Institute has here scored, for this is what it asked for in the Memorandum prepared on last year's Bill.

Provincial Councils.

IN connection with the co-optation of teachers on the four committees for the Training of Teachers to be established in connection with the Universities of St. Andrews, Glasgow, Aberdeen, and Edinburgh, the Institute has taken time by the forelock. At a special meeting of the General Committee, it was decided to recommend the following teachers:—

E.I.S. Doings.

St. Andrews:—

1. Dr. Lowson, High School, Stirling.
2. Dr. Menzies, Webster's Seminary, Kirriemuir.
3. Jas. A. Ross, M.A., Higher Grade School, Buckhaven.

Glasgow:—

1. Dr. Milligan, High School for Girls, Garnethill, Glasgow.
2. Jas. Young, M.A., High School, Biggar.
3. D. M'Gillivray, M.A., Bellahouston Academy, Glasgow.

Aberdeen:—

1. Chas. Stewart, M.A., Gordon's College, Aberdeen.
2. Wm. J. Watson, M.A., Royal Academy, Inverness.
3. Chas. M'Pherson, M.A., Public School, Banff.

Edinburgh:—

1. John Alison, M.A., F.R.S.E., George Watson's College, Edinburgh.

2. Robert Dickson, M.A., North Merchiston Public School, Edinburgh.

3. T. S. Glover, M.A., High School, North Berwick.

In connection with the Education Bill, the same Committee proposed: "That this special meeting of the General Committee cordially welcomes the introduction of the Education (Scotland) Bill, 1905, expresses general approval of its provisions, and respectfully urges on His Majesty's Government the desirability of passing it into law now."

OPENING OF THE EAST HAM TECHNICAL COLLEGE.

ON March 18th, the Prince and Princess of Wales came down to East Ham to open the new Technical College which has recently been built by the borough authority. The Romford Road for some miles was gay with flags and bunting, and the Technical College was the point of universal interest for the day. It is situated close to the splendid Town Hall, and like it is built of terra-cotta stone, which is fast becoming the favourite material for public buildings in East London. It seems to show better against the usual murk of our London sky than the more classic limestone and sandstone of the City architecture. Whether it will be as attractive twenty years hence when the weather and sooty fog have had time to act upon it remains to be seen.

By the courtesy of the Principal of the College, Mr. W. H. Barker, B.Sc., F.C.S., the present writer saw the building a few days prior to the opening, and was at once struck by the way in which the beauty of the interior bore out the handsome external appearance. The side entrance opens into a noble hall, and has a white marbled staircase flanked by two fine granite columns which arrest one's attention immediately on entering; while the main entrance, which will be most frequently used, opens into a smaller hall decorated with tiled walls and pillars. Immediately in front is the Assembly-room; to the right a lofty corridor leading to the class-rooms and side entrance; and to the left the Principal's-room and administrative offices. The Assembly-room is beautifully wainscoted in oak almost half-way to the ceiling, and has a permanent platform at one end for speakers on state occasions, such as the opening day or "speech" day. For everyday use it will be the place of morning assembly, and is further utilised in the evenings as the Committee-room. The chairs, furniture, and wall adornments of this room are all of oak, producing a most harmonious and artistic effect. Indeed, one cannot help being struck by the predominance of oak—oak-desks and seats for scholars, oak-desks for teachers, oak-secretaires, bookcases, and even stock cupboards and lockers of oak. A somewhat novel form of student's desk has been adopted. The seat is exactly like an ordinary wooden chair of comfortable make, and the desk in front of it is supported by a single standard at its centre. On this standard it can be made to move in a line at right angles to the sitter's front, so that the desk of the day-school child of twelve to fourteen years becomes, by a little thrust forward, a comfortable desk for the evening adult student—thus giving the solution to a very common problem in technical schools. Each student's desk has a lock and is numbered, and the Principal's master-key can be requisitioned whenever a difficulty arises through loss or forgetfulness.

On the same floor as the Assembly-room are the Inquiry Office, the Ladies' staff-room, and some eight class-rooms. The walls of the last-named are light green and have a terra-cotta dado; while the oak furniture seems just the right thing to complete the colour-scheme.

On the first floor are the Chemical Laboratories, elementary and advanced, with the preparation room between them; and the chemical demonstration room or lecture theatre adjoins the laboratories.

There are also on this floor Men's staff-room, Modelling-room, Art-rooms, elementary and advanced, and a kitchen, known to most people as a Cookery-room. This has an excellent scullery and pantry opening into it, and shows a forethought in the planning of the building which is everywhere noticeable.

EAST HAM TOWN HALL.

(By kind permission of the Proprietors of the "East Ham Echo.")

The Laundry has an "ironing" and "drying" room attached; and there is a special exhaust fan to clear the air when it becomes too oppressive with the "bye-products" of laundry-work.

A Needlework-room, a Botanical Laboratory, and an Art Master's room complete the list of rooms on this floor.

On the top floor are the lavatories and photographic rooms, operating and dark rooms. The lavatories are exceptionally well fitted up, and there is a large number of wash-basins both for day and evening students.

The day students number 270, and the evening students 850, but there is accommodation for quite 1500 evening students and it is expected that such a number will soon be on the rolls. On the semi-

basement are the cloak-rooms and more lavatories—Physics Laboratory, Electrical Laboratory, Physics Preparation-room and Demonstration-theatre, Metal-work-shop, Brick-work-shop, Carpenter-shop, Timber-store, Plumber-shop and Stokery. The building is lit throughout by electricity and is heated on the "plenum" system, which boasts that it extracts the foul air, sends in pure air, screened and filtered or cooled in summer and warmed in winter, and all without producing draughts. The system was first used in the Aberdeen schools, it spread to the Northumbrian side of the Border, and is now being adopted in London. If

EAST HAM TECHNICAL COLLEGE.
(By kind permission of the Proprietors of the "East Ham Echo.")

the old adage is "Ex oriente lux," the adaptation of it in regard to the heating and ventilation of large buildings must be "Ex boreali 'plenum.'"

It will be noticed that what we may term the workshops of the College all have relation to the building trade. It was found from the returns of the Registrar-General that the bulk of the male adult population of East Ham was engaged in the building and allied trades; and the educational facilities of a purely technical character have been arranged to meet the immediate needs of the neighbourhood. The engineering department is conspicuous by its absence, but inquiry shows that the engineering needs of the district are slight, and for the few who wish for an engineering education, there is the excellent fit-up of the East London Technical College—the one time People's Palace. Thus, there is no unnecessary overlapping between East Ham and West Ham, and educational and wasteful competition is avoided. The aim of the Principal is to have the students go through the Secondary School from twelve to sixteen years, and during the other four or five years of their apprenticeship to their trades to attend the technical classes as evening students. Whether the young people of East Ham will avail themselves of the facilities offered has yet to be proved, but there can be no doubt that the East Ham Educational Committee have done their part of the mutual duty in a way that leaves nothing to be desired.

RUSSIAN SCHOOLBOYS ON STRIKE.

THE schoolboys in Russia will not be behind their elders in the general movement towards reforms. Schools are conducted very much as everything else in Russia, on bureaucratic lines. The boys belong to a privileged class, and are therefore exempt from any form of corporal punishment, officially. Practically, it is impossible to prevent the ushers from enforcing discipline by sly exercise of the fist and even of the boot. Nor is there any possibility of preventing the boys themselves from exercising their own forms of discipline upon the unpopular boy by getting him in a corner and putting him through various refinements of torture. Fights in a Russian school are never heard of, but there is a good deal of hair-pulling and other forms of punishment usually associated in more robust nations with the ideas of a young ladies' seminary rather than with a boys' school. The exemption from physical punishment, officially, is the palladium of the Russian schoolboy, and he thinks himself and his country centuries ahead in civilisation of those lands where the exercise of the cane and the birch is still recognised as salutary to the mind and not injurious to the body. The system of punishment in Russian schools is very different and has all the disadvantages possible, and no advantages that can be appreciated outside Russia. A system of marks is the form of terrorisation used over the minds of the Russian boys. Separate marks are put for "diligence," "conduct," and "progress." The best mark is 5, while 2 is a bad mark, and 1 is very bad indeed. The units are qualified by the addition of a *plus* or a *minus* if necessary, and at the end of the quarter the various marks are totalled up and an average mark put for the quarter, which goes to make up the mark for the year, and so on. Practically all boys get either 4 or 5 for "conduct," and nearly all get the latter mark. A 3 is indicative of possible expulsion, while a 2 is certain to be followed by that extreme measure at the earliest convenient date. With such very severe punishments in view, it might be supposed that the Russian boy was in general a perfect model of good behaviour and diligence. In practice he is much the same as boys elsewhere, and the system suffers: it is not practicable to be always expelling boys even in Russia, where there are always plenty of candidates for vacant places in every class of school. Matters are arranged solely with a view to keeping up appearances—again precisely as in the larger world of Russia generally. If a boy is guilty of any very outrageous form of naughtiness, he is pretty sure to be one of the bad boys whose marks are a tell-tale during the whole period of his career in the school. His comrades here generally step in, and the offence is put upon one of the best boys in the class, and the class will swear to the identity of the offender and the details of the offence

with all the fervour of your true oriental. Thus the real offenders are not very often punished in Russian schools—no more than they are in Russian life. Such a thing as a boy standing up to own to even the slightest breach of class discipline is utterly unknown. "The system makes us lie, and teaches us to lie," said one class to a foreign master who had not yet become accustomed to this first principle of the Russian. The marks are placed on record, and may turn up to settle a boy's start in life five or six years afterwards! On the other hand there are always some boys who get the "excellent" mark, a 5, always and in every subject, and finish the schools with a certificate showing that in every possible branch of learning they are super-excellent—which is absurd, as Euclid says. It is something more than significant that these super-excellent boys are often that particular kind which the honest English master at home can hardly help detesting: the obsequious little wretch who, if ever he is caught with an unprepared lesson, has always an excuse which is worth half-a-dozen lessons in its way: the dull, plodding, helpless fellow, who has not spirit enough to be naughty, and learns his lessons by rote—the despair of most masters at home, these are the prize boys in Russia. Once they are marked as "fivers" the class will help them to escape any possible dangers, and they are looked to by their comrades to get the worse boys out of scrapes by every form of petty meanness which a school can find room for. As there are no games in Russian schools, there is nothing of that special form of discipline provided by boys whose prowess in the field is more than equal to the reputation of the head-worker in class. The pet of the class in Russia is the boy who can best invent excuses and continue a course of bad behaviour and idleness the longest with impunity. The end is generally expulsion, but until that fate overtakes such boys they are doing nothing but harm to their comrades, and other punishments, which might make something of them, do not exist.

It is not necessary to elaborate all the results of a system thus cursorily suggested, but the time has come this year when the Russian schoolboy, fired by the same spirit of self-examination and aspiration towards better things as his elders, has found it necessary to make a demonstration in favour of those ideals which youth is ever ready to appreciate, but in Russia can appreciate only at the cost of rebellion against the existing order of things. Throughout the country this last month these rebellions, "strikes," have been the order of the day. The general run of them is something like this. One fine morning the whole school rises earlier than usual, requests the presence of the head, and presents him with a written list of "demands." If the head be a man wise in his generation, he takes the demands and promises to consider them: if not, he declines to see the boys, and they then proceed to show their feelings in various ways. Sometimes they proceed to the great hall, where, as in every official building in Russia, hang the portraits of the reigning and past Emperors. Speeches on political subjects, freedom and citizenship, and all the rest of it, are sure to be made, and finally the imperial portraits are often torn down, spit upon, and otherwise abused. Then comes the demonstration in the street. Many of the boys take a holiday, while the very earnest ones make up a procession and go round to other schools to call out the boys, and even the girls from the girls' schools, to join in the demonstration, which then usually becomes a purely political affair. All private school grievances are forgotten in the feeling that the little and big fellows in school uniforms are also part of that great class known as the *intelligentia* of Russia, and they must do their part in securing the elements of political freedom from the bureaucracy which has usurped and deformed the pure ideal of the Czar's autocracy.

The movement is "engineered," of course, from without, and the boys of the secondary schools are mostly

RUSSIAN SCHOOLBOYS.

acting upon suggestions from those who should know better than introduce disorder into the quiet realm of school. In many cases the teachers themselves are said to have roused the boys to a sense of what the nation is contending for, and naturally the boys have not failed to seize the opportunity for a little amusement and some useful private reforms.

These "strikes" usually last a week, by which time everybody has had enough of it, and work is resumed. During that week, however, the position is a curious one: the boys behave with punctilious perfection, but decline to do anything in any way connected with work. Until their demands are complied with not a stroke of work is done, but perhaps never before has a week passed of such perfect good behaviour. And the demands? Well, here is a typical list of demands presented by the boys of a well-known Moscow school:—

"1. Humane treatment of the boys of the lower classes: (*a*) Not to use force as in the cases of (here follow names of boys who have been hit by ushers), not to use bad language, and not to be always threatening

them with mention in the 'report.'[1] (*b*) To try to destroy in the younger boys the idea now prevailing of the ushers and the school authorities in general as of some terrible machine for punishment. (*c*) To hint to certain of the ushers that there are other means of working upon the hearts of children than by threatening them with the 'report.' (*d*) To lighten the forms of punishment as much as possible, and in particular to stop depriving the children of their dinners and lunches, and shutting them up in lonely rooms.

"2. Due respect for the members of the upper school." (The main point in this paragraph is the permission to part the hair in what is known in Russia as an "English parting," Russians usually wearing the hair without any parting at all; and the permission to wear moustaches and beard.)

"3. Right to send and receive correspondence in the upper school without control.

"4. More freedom for the upper school.

"5. Introduction of more humane relations between masters and boys, to replace the present military official relations existing.

"6. Due respect to be paid to the parents of boys, whether poor or not.

"7. Right to use the school library books.

"8. Improvement in the food provided."

The above demands are interesting as showing some of the worst features of Russian life in general. The masters of schools, as the civil servants in departments of state, all wear uniforms, and regard the boys under their care only too often as beings of another world whom it is their privilege to command. This is apparently what is meant by the "military official discipline," the want of any human touch in the relations between boys and masters. How very far this military manner can be carried is occasionally exemplified in a painful way when boys take to shooting their masters with revolvers, generally on behalf of the whole class, when other means of agitation have failed to effect a change in the manner of the obnoxious master. These cases have been increasing largely of late years. The boys aver that no one will listen to their complaints, that no one believes their word, or their parents' word, against the word of usher or master, and in fine that they have no means of redress for injustice: in all which they only echo the cry of the whole Russian nation. The wearer of a uniform in Russia is a greater despot in his small world than ever was any Czar in modern days over the Empire at large. In the case above mentioned every one of the "demands" was conceded by the head, and everything went well afterwards. But in other towns of Russia worse things happened. In Kursk the police, not daring to use their sabres against children, set on a body of hired ruffians to beat a procession of schoolboys "on strike," and some of the little fellows were half murdered. One father afterwards pathetically said at the municipal meeting called to consider this awful deed, that of his two sons one had spent his blood on the fields of Manchuria and the other had been crippled for life if not killed by the police at home. It is a curious and interesting period that Russia is passing through, and Russian schoolboys mean to have their share in the triumphs to come!

[1] The much-dreaded "report" is that made to the head in written form. Any boy who for any reason whatsoever has in the course of a week received a 2 for anything whatsoever, conduct, diligence, or lessons, is kept at school on holidays and week-ends. Many dull and naughty boys thus spend months and months at school without ever seeing their homes and parents. As there are no forms of recreation in Russian schools, the boys are dependent upon their "leave" at week-ends and on holidays for everything that keeps them human.

A JAPANESE WOMEN'S UNIVERSITY.

OUR allies in the Farthest East have been much before our minds during recent months, and many aspects of Japanese life have been discussed. Many facts and not a few fictions have been set forth in print for our information regarding this newly discovered people. It is not unusual to hear Japan spoken of as a country but recently emerged from barbarism, despite the fact of its possessing an ancient and highly developed civilisation. We regard the introduction of mechanical inventions, electricity, and the apparatus of modern warfare as proofs of the dawn of civilisation, oblivious of the fact that these things are comparative novelties even among ourselves, and that before their coming we were still a civilised people. There is, in fact, some danger of our measuring the civilisation of a country by the rate at which it is able to slaughter its enemies rather than by the level at which its domestic life is lived.

The change in the *direction* of its civilisation is, however, a remarkable fact about Japan. There has been a very general adoption of Western ideas and methods. Such a movement, it can be easily seen, is not necessarily a step forward in true progress. Yet in the case of Japan we may safely regard it as a real advance, and that chiefly on account of the fact that every new idea is modified in accordance with the genius of the people, and not merely transplanted as an exotic growth. The old life of the country is not destroyed but enriched by the new elements.

We are already aware, through our newspaper and other reading, that in the art of war Japan has improved upon any lesson she has been taught. We have now to note the same feature as regards her education.

After a lengthy struggle we have now, to some extent at least, secured university education for women. Some of our universities, those which would claim the highest degree of civilisation, still ignore their demands; our younger institutions admit them on more or less equal terms with men. Japan has instituted at Tokio a university exclusively for women, which has some six hundred students in the university properly so called, and about as many more in its preparatory department. There is one plain lesson for ourselves.

The aim of this women's university presents another lesson. It is "to impart higher education to the daughters of Japan with the object of enabling them satisfactorily to discharge their duties as women, wives, and mothers, fully equipped with ideas and knowledge, in touch with the progress of the nation and the world." That is to say, the object of the higher education is not to ignore the fundamental difference of sex, or merely to prepare women for competing with men in certain professions; it aims at the development of women as women—an aim which is not yet apparent in our own programmes of higher education.

Up to the present time, the number of the men in

Japan has been in excess of that of the women, and the problems of wage-earning have not been pressing for the latter. Unfortunately, the present war will have as one effect the forcing upon many women of this difficult question. No doubt the changed conditions will be met as far as possible in the course of education in the women's university, but still we need not fear that so enlightened a people will imitate our blunder of presenting their girls with a professional man's training as the highest ideal of education.

The course of this university is worth our notice. Since the higher education as it exists among ourselves and elsewhere is notoriously beset with danger to the health of our girls, the Japanese have laid special stress upon matters of hygiene. There is also provision for the study and practice of the elaborate etiquette and ceremonial of social life, and of such necessary accomplishments as the art of arranging flowers. It would be ungallant, perhaps, to point the moral here; yet a mere man cannot read such statements without a surreptitious sigh. The curriculum embraces basket-ball and ceremonial tea, classics and cookery, civil law and house decoration.

There are three distinct courses of study, Domestic Science, Japanese Literature, and English Literature. The compulsory subjects for all students, however, include Psychology, Child Study, Ethics, Hygiene, Education and Nursing of Children, and the History of the Fine Arts. The optional or elective subjects are numerous, and need not be here specified.

The university is residential, and manifests a social life of peculiar variety and richness in many departments. One of the "houses" is in the charge of an English Professor, and is built and furnished in the English style, as a practical means of instruction regarding English home life.

We note also the existence of a practical industrial department, "to propagate economic ideas, and the spirit of labour, frugality, and independence"—an aim which has not been very fully met by our own university courses in the past. In this department, with its sections dealing with commerce, banking, agriculture and horticulture, cooking, and the like, the work is carried on as far as possible under the economic conditions of everyday life, and actual work in producing and selling forms the really educative feature.

Those who are interested in this matter will find it somewhat more fully discussed in the American journal, *The Pedagogical Seminary*. In the meantime, enough has been said to indicate the objects and methods of this unique university.

We cannot but feel that in this matter the Japanese mind has, with its characteristic acuteness, envisaged the problem of the higher education of women more successfully than we have yet been able to do, and has devised a very practical means towards solving that problem. This university seems to be primarily an institution at which women of the better classes may be provided with an education which has a direct bearing upon their future life. There is no good reason for regarding literary and artistic culture as incompatible with housewifely skill; they ought surely to be combined in the woman who presides over every considerable house in the land. Yet we think of the former quality alone as education; the most important problems which arise under the latter heading receive no consideration from any university. We are still divided into two opposing camps—those who consider the kitchen or nursery and the drawing-room respectively as the "sphere" of woman. Will it be necessary to send our girls to Tokio before they can receive an education which will qualify them to exercise a supreme and beneficent reign in both domains? Or will our next treaty with Japan provide for the organisation in London, under Japanese auspices, of a university where education *for women* will be obtainable?

KING'S SCHOLARSHIP EXAMINATION.

The following important circular has been issued by the Board of Education:

BOARD OF EDUCATION,
WHITEHALL, LONDON, S.W.,
28*th March*, 1905.

SIR,—It has been represented to the Board of Education that the time of the King's Scholarship Examination, which in recent years has fallen in December, is no longer convenient, in view of the fact that the majority of Candidates are Pupil Teachers, who, in accordance with the Pupil Teacher Regulations, will, as a rule, be receiving instruction for a period of two years from the 1st of August. Each of these years is generally divided for purposes of instruction into three terms. If, therefore, the present date of the Examination is retained, it will be necessary for Pupil Teachers either to take their Final Examination at the end of the fourth of the six terms of their course, or to defer it until some months after the completion of the second year of that course. The most convenient date for such a Final Examination would no doubt be in the June or July immediately preceding the termination of the two-year period. In view, however, of the fact that the Certificate Examination and the Examination of Students in Training Colleges fall at that time of the year, it would not at present be possible for the Board to fix such a date. They desire, however, as far as possible, to meet the very reasonable objections to which the existing date gives rise; and the following arrangements will be made in order to enable the Examination of Pupil Teachers whose engagements terminate on the 31st of July, 1906, to be brought somewhat nearer to the close of those engagements.

(1) The King's Scholarship Examination for 1905 will, as already announced, be held on December 12th, 1905, and the following days, in strict accordance with the Regulations and Syllabus already published.

(2) Candidates will, however, have the option of presenting themselves for an alternative Examination. This will be the King's Scholarship Examination for 1906. It will be held in two Parts. All Candidates must be either Pupil Teachers, or persons not being Pupil Teachers who will be over 18 years of age on October 1st, 1906. No Pupil Teacher will be admitted to the Examination before the commencement of the last year of his engagement.

Part I. will be taken in December, 1905, on the same dates and at the same places as the 1905 Examination. It will be open to Candidates, whether Pupil Teachers or others, who intend to complete their Examination by taking Part II. in April, 1906. Such Candidates will be examined either on paper or orally in the following subjects:—

Reading, Repetition, } These subjects will, in the case of Candidates employed in Public Elementary Schools, be tested, as far as possible, before the date of the Examination.
Arithmetic,
Penmanship,
Dictation,
Drawing,
Music,
Needlework (for Women).

No Candidate will be allowed to proceed to the second Part of the Examination who has not satisfied the Examiners in the first Part. This test will be a qualifying one merely, and no marks for the subjects included in Part I. will be credited towards Part II. of the Examination.

The second Part of the Examination will be held in the week immediately preceding Easter, 1906, beginning on Tuesday, April 10th, at Training Colleges and at such other places as may be necessary.

The following subjects will be compulsory for all Candidates:—

(1) English Language and Literature,
(2) Geography,
(3) History,
(4) Composition.

The following subjects will be optional:—

(5) Elementary Mathematics, including Algebra and Geometry,
(6) Elementary Science,
(7) One Language other than English, viz. either Latin, Greek, French, German, Hebrew or Welsh.

The detailed Syllabus will be issued shortly, but this Syllabus will not for 1906 differ substantially from the detailed Syllabus for 1905.

Candidates who are recognised by the Board as Pupil Teachers at the date of Part I. of the Examination, or who, not being Pupil Teachers, have been employed in Public Elementary Schools in some recognised capacity other than that of a monitor for not less than a year during the two years immediately preceding that date, will be credited with an allowance of marks towards the results of the Examination, unless an unfavourable Report upon their teaching capacity should have been received from the Inspector.

Candidates successful in Part II. of the Examination for 1906 will be arranged in three Classes, in accordance with the aggregate number of marks obtained in that Part of the Examination.

(3) There will be no complete King's Scholarship Examination in December, 1906. The Examination for 1907 will, like that for 1906, be held in two Parts. The second Part will probably be held either at Easter or at Whitsuntide, 1907. The Board hope to arrange to hold the first Part upon some suitable earlier date at various Pupil Teacher Centres, and other convenient places of Examination. A detailed Syllabus showing the further changes which it is proposed to introduce into the 1907 Examination will be issued as soon as possible.

(4) Different Forms of Application will be supplied by the Board for Candidates who wish to take the 1905 Examination and for those who wish to take the 1906 Examination. Candidates who may have already forwarded to the Board one of the Forms 12 (Exam.), hitherto in use, will be asked to state which Examination they prefer to take. The names of all Candidates for either Examination should be notified before October 1st, 1905. No notification will be received after that date except upon payment of a fee of 5s., and no notification can on any account be received after November 1st, 1905.

(5) It is possible that the change in the date of the King's Scholarship Examination may entail some corresponding change in the date either of the Certificate Examination or of the Examination for the Admission of Pupil Teachers, or of both of these. Due notice of any such change will be given by the Board.—I have the honour to be, sir, your obedient servant,

ROBERT L. MORANT.

THE President of the Board of Education has appointed, with the concurrence of the President of the Local Government Board, the following an Inter-Departmental Committee:—

(1.) To ascertain and report on what is now being done, and with what result, in respect of medical inspection of children in Public Elementary Schools:

(2.) And further, to inquire into the methods employed, the sums expended, and the relief given by various voluntary agencies for the provision of meals for children at Public Elementary Schools, and to report whether relief of this character could be better organised, without any charge upon public funds, both generally and with special regard to children who, though not defective, are from mal-nutrition below the normal standard:—

Mr. H. W. Simpkinson, C.B., Assistant Secretary of the Board of Education, Chairman.
Mr. H. Franklin Parsons, M.D., Assistant Medical Officer under the Local Government Board.
Mr. C. Jackson, Chief Inspector of Elementary Schools under the Board of Education.
The Hon. Maude Lawrence, Chief Woman Inspector of the Board of Education.
Mr. R. Walrond, Senior Examiner of the Board of Education.

With Mr. E. H. Pelham, Junior Examiner of the Board of Education, as Secretary.

PRIMARY EDUCATION IN NEW SOUTH WALES.

THAT excellent little brochure, the "Year Book of New South Wales," contains this year an interesting epitome of the educational system of the colony. New South Wales is certainly the happy possessor of an excellently devised system—one which must not only produce gratifying statistical returns, but must also have a marked effect on the status of the colony and its inhabitants. The soundness of the whole scheme lies in the perfect gradation of its various branches. The "educational ladder" leading from the primary school to the University is considered by some to be the highest aim of an educational scheme. The metaphor is not wholly a happy one, for a ladder leads but in one direction, while in the later stages methods of education must diverge to fit different classes of pupils. A University training is of course of inestimable value, but there are thousands in every country who need instead some more specific training for their own special requirements. The primary school should lead as easily to the technical school as it does to the University. This aim is achieved in great measure in the New South Wales scheme, which must therefore rank as a truly educational one.

The system of primary education may be of interest to educationists here at home although we may not agree with all its details. The administration of education is in the charge of a Government Department, there being no transference of authority to local authorities. The Minister of Public Instruction—a member of the Government—is the educational chief, and is directly responsible to Parliament. One advantage of this is apparent—that the teachers are civil servants and have accordingly somewhat a better status than their confrères at home here in England.

The colony boasts of some 2800 schools under Government inspection, with 243,516 children on the rolls. The average attendance does not reach a high level—the latest figures being 154,382 children, this being less than 65 per cent. of those on the rolls. Where necessary, the State provides vehicles for the conveyance of children living in outlying districts to and from the nearest school. In this connection it may be interesting to note, that if a child lives at a distance of more than two miles from the nearest school, he is legally exempt from the obligation of attending. Otherwise, children are bound to attend school between the ages of six and fourteen, and regular attendance is enforced by fines or alternative imprisonment. School fees are the rule in the colony, but they are not excessive, and are always remitted where good reason can be shown. The maximum fee is threepence per week, and not more than a shilling is charged for the members of one family however numerous.

The teaching staff is a most capable body of men and women, whose average qualifications are perhaps somewhat above those of their English confrères, for the trained certificated teacher has to undergo a further examination, both theoretical and practical, before taking up an appointment. The pupil-teacher system has not been developed to any great extent, and the few pupil-teachers that exist depend solely on their head-teachers for instruction. Candidates for the teaching profession have to pass through a Training School, and at the end

of the course obtain certificates varying in grade. On the quality of this certificate depend both their future appointments and their salaries. These latter vary considerably, but on the whole are not so lucrative as those we have in England, since the cost of living is higher. £72 is an average minimum figure for a small school, while the head of a large school (600) will perhaps obtain £350. A residence is generally provided in addition to these sums.

The education given is of course much the same as in our own schools. The whole of the State schools are unsectarian in their religious teaching, but licence is given to ministers and other authorised persons to teach during certain prescribed hours the doctrines of their own denominations. The teachers of New South Wales still work under the old "examination" régime. Inspectors are appointed by the State, who, to quote the words of the Year Book, "visit the schools and examine the pupils carefully in all the subjects they have been taught." With this important exception work in the schools differs very slightly from our teaching work at home. Our Higher Grade schools find a parallel in the "Superior" schools of the colony, in which a more advanced curriculum is followed, including higher mathematics, languages, and science.

The English teacher would not be well advised to emigrate with the idea of continuing his profession, for the colony is well supplied with teachers. The standard of attainments required of the teacher is also somewhat higher than in England.

The transition from these primary schools to the secondary schools is made easy for the child by many open examinations. The fees charged are not excessive, three guineas per annum being the maximum. In these secondary schools the boy is educated until old enough to enter Sydney University, if that be his aim.

Space will not admit of a full description of the technical education carried on in the colony. It must suffice to say that technical work is introduced in the primary schools, and that from these a boy may go to one or other of the many excellent technical schools, of which the Sydney Technical College stands *facile princeps*. These technical institutions have their curricula adapted to the particular needs of the district, and undertake such subjects as agriculture, horticulture, and mining work.

At the head of education is the Hon. Broughton Barnabas O'Conor, who is responsible for this excellent scheme which assures to the colony an increasingly effective and highly trained population, and which cannot fail in time to raise New South Wales to a very high level among the nations.

EDUCATION IN SOUTH AFRICA

Article II.

(a) *The Educational System of Cape Colony;* (b) *Classification of Schools;* (c) *School Examinations and Inspections;* (d) *The Teacher's Social and Domestic Life.*

Educational System.

IN Cape Colony there are, speaking generally, two classes of schools: (1) *Public* schools, *i.e.* schools under the control of the Department of Public Education; and (2) *Private* schools, *i.e.* schools belonging to private individuals or different religious bodies, such as the Roman Catholic community, English Church or dissenting bodies. The private schools are few in number and not very large. The most important schools are the public schools, both as regards numbers and standing.

Classification of Schools—Public Schools.—These are graded and known as *A1* and *A2* schools. Broadly speaking, the *A1* and *A2* schools answer to our secondary schools, our public and grammar schools for boys, our high schools for girls. The control of these schools in all financial matters is dual, partly in the hands of the Education Department and partly in the hands of the school local committees, which committees, in most cases, first started the school as a private one and then placed it later under the Education Department. The control of these schools in matters scholastic and educational is *entirely* in the hands of the Superintendent-General of Education, Dr. Muir, the head of the Education Department. The curriculum is determined by the requirements of the Education Code, and the recognised public examination syllabuses; and the schools are visited and inspected annually by the inspectors and instructors appointed by the Superintendent-General of Education. The teachers in these schools may be and often are selected by the school committees, but the appointments in all cases have to be confirmed by the Superintendent-General of Education, who is very rigid in enforcing professional as well as scholastic fitness for the posts. There are also *A3* schools, *i.e.* schools for the poorer classes of white people, and in some exceptional cases *A3* schools for natives or coloured children.

The *B* schools are for the natives or coloured children.

The *control* of these schools is the same as that of the *A1* and *A2* schools. In matters financial the responsibility is shared by the Education Department and the school committees; a large number of these schools belong to religious bodies and are distinctly sectarian. The Education Department is entirely responsible in all matters educational.

Training Institutions.—There are also special institutions for the training of teachers, the chief of which are in Cape Town, Wellington, Grahamstown, etc.

At Cape Town and at Loveday there are special establishments for training native teachers.

The pupil teacher system is in vogue. Almost all the large *A1* and *A2* schools, both boys' and girls', have special arrangements for instructing pupil teachers; here there are often separate pupil teacher centres with special teachers apart from the teachers engaged also in the work of the school itself. No part of the education work in Cape Colony is more interesting; nothing I am sure is more valuable than the work going on, notably at Wellington in the western provinces, and at Grahamstown in the eastern provinces respectively.

Wellington. — The little town of Wellington is situated on the main route to the Orange River Colony and the Transvaal; it lies practically bedded among high hills and in the centre of wide-stretching vineyards. The casual visitor to this picturesque little place would never imagine what an educational centre it is, unless he went there for the express purpose of visiting the schools. The training school is doing a very great work. The buildings are good and modern, and schools, training schools, and colleges alike testify to real educational enthusiasm and work.

Grahamstown.—At Grahamstown, the work in connection with St. Peter's Sisterhood is also well worth

a visit to any one travelling in the eastern provinces. Grahamstown itself is somewhat off the main line; the journey from Alicedale is most picturesque. The town itself is very English, and is remarkable for the number and size of its schools (day and boarding schools). The training schools owe much to the zeal and initiative of Mother Cecile, the Mother Superior. She is a great pioneer in educational work; here special attention is paid to training teachers for work in secondary schools. Here, too, at Grahamstown, there is a *Housekeeping School*, where cooking, needlework, and laundry work are taught, and training given to would-be teachers. Special arrangements are also made here for training *native* laundresses, cooks, and needlewomen.

There is also a School of Art and a School of Music, with a staff of home and specially trained instructors and instructresses.

Farm Schools.—There are farm schools for the instruction of children unable to attend other schools owing to distance. These schools are under the control of the Education Department. The teacher, whether a male or a female teacher, lives with the principal farmer and his wife, instructing their children and such other children as there may be within distance to attend.

Special Schools.—There are schools in different parts of the Colony for defective children. I visited a school for deaf mutes and one for the blind at Worcester, and was interested in the work going on there.

There are also industrial schools at Kimberley and at Uitenhagen, which I have seen. There are probably many others, but I have not visited or heard about them.

This branch of education work in the Colony will doubtless be developed more fully in future years. It is certainly a branch of the work which needs attention on the part of the authorities.

Compulsory Education.—Until within the last few months school attendance has not been compulsory; now it is compulsory on white children between the ages of 7 and 14 years living in towns or within a reasonable distance of towns. I am not quite sure of the mile radius, and have not the regulations at hand to refer to.

Fees.—Fees are paid monthly in all schools, and vary from 4d., 6d., and 1s. per month to 10s. and £1 per pupil, and even more. These fees are for instruction; fees paid for board are quite separate and vary in the different boarding establishments connected with the various schools all about the country.

The Government supplements these fees, but in no case undertakes the entire support of a school; local effort does its part towards the support of the local schools.

Examinations and Inspections.—The examination requirements are many and press often heavily. Each school is examined annually by the Government inspectors and instructors, and also receives surprise visits during the year. There is a chief inspector in each district; a special instructor for drill, singing, wood-work, and carpentry; and instructresses for needlework and kindergarten work. Each instructor and inspector makes his or her own report, so that the department is kept completely in touch with the work going on in each school. The number and frequency of visits paid, while it obliges each school to do definite work of a kind, tends to break up the work of the year into special preparation, often into "cram," to meet the requirements of inspectors or instructors, and to press very heavily on the over-conscientious teachers and pupils. The benefit or harm resulting from such a system depends very largely, of course, on the intelligence and tact of different inspectors; but with every care and the best possible feeling between these different authorities, there is a distinct overlapping of work, often a conflict of opinion and report and a waste of energy; and what to me always appeared a result greatly to be deplored, a deadening of individual initiative and enthusiasm. In the case of infant classes the number of inspections is most harmful. For infants a true correlation in subjects of instruction and the forming of right habits of thought and action by a well-planned daily school routine is essential, and the value of the education given is most truly tested by the atmosphere and general tone of the school, and by the teacher's own work, schemes, and school records, rather than by the examination of individuals in the three R's, and the passing of infants in special subjects. Many facilities for self-improvement, and for increasing their professional fitness, are offered to teachers. Vacation courses are held twice a year in the Western and Eastern Provinces, respectively, for teachers in outlying districts; monetary help and every encouragement is given to teachers to attend one or other of these courses.

During the year courses of instruction are also given at different places by the instructors in their special subjects, so that although the Superintendent-General of Education is severe in his requirements, he is also just and considerate, and affords the willing and industrious teacher every opportunity and encouragement for meeting his requirements.

School Examinations.—School examinations are serious matters. The annual inspection is an examination of individuals, and is an important matter for the teachers, whose good-service money and eligibility for a pension depends largely on these inspection reports; and it is also a matter of importance for the pupils, since failure to acquit themselves to the inspector's satisfaction may entail a serious set-back in school advancement.

University Examinations.—The *A1* and *A2* schools prepare their pupils also for the examinations of the Cape University. These examinations are known as "School Higher" and "Elementary," and prepare the way for the Cape University Matriculation Examination, which corresponds nearly with our London University Matriculation Examination; and, like the matriculation examination with us, is preliminary to the Intermediate examination, and to the final B.A. and B.Sc. examinations. For those preparing for the teaching profession there are pupil teachers' examinations each year, the *T3* being the highest certificate or *T2* in special cases. These pupil teachers' examinations are held by the Education Department, and not by the University. The Government inspection of the upper standards in an *A1* or *A2* school is compulsory, as well as taking "School Higher" and the "Elementary" examinations.

If examinations entered for, and passed annually, are hall-marks of the real education given in the schools of the colony, then those schools and the curriculum followed in them is all one can desire; but to many of us the examination test is not the highest or the most satisfactory, and it is to be hoped that, as time passes, teachers are more efficiently qualified, and the schools generally are better equipped

and staffed, and the standard of school work generally is raised, the pressure of constant outside examinations may be removed and be replaced by one final leaving-school examination, accompanied by a leaving certificate as to character and general fitness for life work.

The Code requirements for *A1* and *A2* schools, and *A3* and *B* schools, is practically the same in the essential subjects; no great difference is perceptible until the lower standards have been passed. Here, again, the good or evil of this unity of work standard must depend largely on the inspectors who administer the Code. The rigid mechanical inspector who requires cut-and-dry results, and is more or less indifferent to the methods used to obtain these results, brings out all that is worst in the system; the more intelligent inspector, who, while requiring results, takes special note of methods, rises superior to any deficiencies in the Code requirements, and does much towards raising the standard of work and the value of the education given.

Exhibitions.—Much is done to encourage hand and eye training, voice training, and the physical well-being.

Exhibitions and Competitions.—Yearly exhibitions of work are held in some town or other to which schools from all parts of the colony send contributions. The needlework exhibits are excellent, those from native schools particularly commendable. Singing or drill competitions are also held to encourage schools to specialise in these subjects. Many of the school buildings are excellent, well furnished and equipped. Each year new buildings are being erected, and old buildings renovated or altered to meet modern requirements, all this work testifying clearly to the interest that there is throughout Cape Colony in educational matters.

Natives.—The work in the native schools is most interesting, and offers an important sphere to the young missionary. It is in these schools that there is a field for true educational effort, since upon the education of the natives on *sensible* and *true* lines lies one means of helping towards the settlement of the difficult native questions.

Teacher's social and domestic life.—The teacher's pay in the Government schools is on the whole very fair, comparing it with the pay in other parts of the Government service, and there is a distinct "move" towards raising salaries all round. Teachers are paid monthly, and are as a general rule engaged by the month, and are subject to a month's notice of dismissal. Of course, this monthly engagement does not hold with teachers engaged from home, who are generally on a three years' agreement. Home teachers should be careful in securing formal written agreements, stating the terms of their agreement very clearly, and have these signed *before* leaving England. Such care will prevent misunderstandings and in some cases unjust treatment later on. School hours are five per diem for teaching purposes. The exact hours vary somewhat according to locality and season, but speaking generally few schools are open after 3 P.M., so that teachers have a good bit of free time. Resident teachers have, of course, "charges" or supervision duties, but as these are shared by all assistants equally they do not press unduly on individuals.

The *home life* of resident female teachers is a most pleasant one. Much is done by principals to give their assistants a real home life; special sitting-rooms are provided, and entertaining of friends, with certain reasonable restrictions, is allowed. Teachers from overseas are allowed to remain free of charge at their schools during the shorter holidays; for about a month during the summer or Christmas holidays they are expected to provide for themselves. Non-resident teachers, if they have no home or friends to board with, find homes in good boarding-houses or in chambers, going to meals to some hotel or good restaurant; the cost of living varies from £5 to £8 per month. The comfort of life depends largely on a teacher's power of helping herself; adaptability to fresh conditions of life, power to associate and sympathise with those one lives with, means much and makes for happiness. People are wonderfully kind to teachers; invitations for the holidays, to spend days, to go to theatres, and for picnics are constantly given. It entirely depends on the teachers themselves whether their social life is pleasant or not. The caution I gave in a previous article on the danger of making pleasure and "the having a good time" the first consideration, is a very real temptation to a young teacher. It is quite natural to wish to see a new country, to take part in the social life and to share in the civic interests; and provided these diversions are kept in their proper place, the teacher of either sex may do his and her part as a true citizen of a new country. It is well, however, to keep steadily in view, that the object of coming out to the colony is to help forward in the educational work of the colony; hence the improvement of school work; making our schools real centres of educational life must be the chief consideration.

EDUCATION IN FOREIGN LANDS.

Russia.—At first glance the connection between alcohol and education does not seem very apparent, but in England we have established a connection between what is commonly called the "whisky money" and education. In Russia the rural schools depended largely for their support on the produce of the excise on spirits. Since the sale of spirits has become a monopoly of the State the schools have lost this source of revenue. It is now proposed by many of the communal authorities to increase the price of spirits, and to devote ten million roubles of the extra revenue thus obtained to educational purposes. As things now stand in Russia, the Government appears ready to welcome this additional source of revenue, but by no means disposed to devote it to educational purposes, so that the intimate connection between vodka and education does not appear likely to be restored as yet.

Germany.—From several parts of Germany comes a wail over the dearth of teachers. In many of the rural districts of Prussia the question has reached an acute form. Generally speaking, the dearth of teachers is due to two causes which go hand-in-hand—the poor educational equipment of the teaching staff and the miserably inadequate salaries they receive. Teachers will not stay in the rural districts if they can get away to the towns, where the work is lighter and the social position of the teacher better. The question of more adequate remuneration for the teachers in Prussia will, it is hoped, be shortly taken in hand by the Minister of Education. The subject of university training for elementary teachers has been for some time debated in educational circles, and there is a general feeling that the time is ripe for some advance in this direction. The last published statistics in Prussia mention 152

cases where teachers had on an average more than a hundred children each to manage. Still worse cases exist where teachers have over two hundred children to teach without assistance. In Eulo one teacher still has, and for some time has had, 260 children to teach. In not a few cases are villages entirely without teachers, and the expedient of half-day schools, conducted by teachers in neighbouring villages, has to be resorted to. One such case is cited, where a teacher, after instructing over a hundred children in his own village from 7 A.M. to midday, has to undertake an hour's journey to a neighbouring village three days a week, and teach 85 children between the hours of two and four.

From the town of Lübeck comes a piece of news in curious contrast with what has been cited above. The town is suffering from an over-supply of teachers! While Hamburg only produces one man student of a training college to every 4109 inhabitants, the proportion in Lübeck is 1 to 605. Added to this over-supply from the town itself, there has been a considerable influx of teachers, seeking better conditions, from Oldenburg. The town authorities have met the dilemma in a curious way. They have found employment for all the students who left the training college last Michaelmas, who are employed for various fractions of the school time, and are paid proportionately to the time they are employed. The young masters and mistresses, who left college high in hopes and with exalted ideals, are likely to have their enthusiasm sobered in trying to solve the problem of supporting existence on sums varying from £20 to £25 per annum.

Elberfeld is trying the experiment of a gymnasium above the school, instead of outside the school on the level of the playground. The space between the ceilings of the class-rooms and the floor of the gymnasium has been well packed with material to deaden the sound. The cost of construction has been about £1000 less than that of the usual separate buildings, and the fact that the scholars for their physical exercises will not have to cross the playground tends to keep the school-rooms cleaner.

Belgium.—The *Fédération des instituteurs belges* is organising an international conference on elementary education at Liège in connection with the exhibition which takes place there this year. The conference will be held from September 2 to September 7. The subjects of discussion include: (*a*) The elementary teacher: his mission, culture, and social position. (*b*) The necessity for compulsory school attendance, and length of obligation. (*c*) Education of mentally deficient and abnormal children. (*d*) Instruction in rural subjects in public schools. (*e*) The material, hygienic, and pedagogic conditions of instruction in elementary schools; school attendance. (*f*) What can the school do to promote the brotherhood of nations and to further the cause of universal peace? (*g*) Co-operation of home and school in the education of the child; protection of children. (*h*) Is it desirable to establish a central international bureau for teachers' organisations? The programme embraces most of the points of importance in connection with public schools, and brings into the arena of discussion questions which have so far only been debated in limited circles. The honorary presidency of the Congress has been offered to the Minister of Public Instruction in Belgium, who did not only content himself with refusing the proffered position, but sent a circular to the members of the Diplomatic Corps in Brussels, pointing out that the Congress had no official character. The incident has created an unfavourable impression and has been much commented on.

King Leopold on New Year's Day referred to the wonderful progress of Japan during the last twenty-five years, and to the development of the German commercial and naval fleet during the same period. The *Petit Bleu*, with a charming affectation of simplicity, suggests that the monarch's object was to bring into more startling relief the retrogression of his own country during that period, under a régime which has deliberately preferred inefficiency to efficiency in education, has seriously neglected military affairs, and has put its own continuance in office before the welfare of the State. How serious is the state of affairs educationally in Belgium may be surmised from the fact that there are 150,000 children who practically attend no school, and that the statistics of recruits for the militia show that there are 30 per cent. who do not profess to know anything of arithmetic, and whose reading and writing leave much to be desired.

Chili.—The Government has ordered the closing of all the schools conducted by the Christian Brothers. The decree has caused a great sensation throughout the Republic, and the Catholics announce their intention of actively resisting the execution of the order.

Sweden.—In our last issue we mentioned the low minimum salaries which Swedish teachers can claim. The teaching body in that country are now asking for an initial salary of 900 kroner, with three five-yearly increments of 200 kroner each.

Switzerland.—Very curious proceedings have taken place in Lucerne in connection with a question which has long been debated in the canton. Since 1900 there have been frequent press attacks on the management of the cantonal Training College at Hitzkirch. Individual teachers were attacked, and the monastic spirit which pervades the institution came in for severe criticism. Thereupon the Cantonal Council appointed a commission of three to investigate and report on the question. Circulars of questions were sent out to numbers of teachers trained at the institution, the teachers being assured that their answers would be regarded as confidential. Nevertheless, these documents, bearing the signatures of the teachers, were sent to the professors of the Training College whose capacity and methods were impugned. At a later period several of the teachers who had been communicated with were invited to meet the members of the investigating committee. To their surprise they were confronted with the Cantonal Inspector of Schools and the director and professors of the Training College. Instead of the rôle of witnesses, they found themselves looked upon as defendants and the staff of the Training College as plaintiffs. The matter did not rest here, for the Great Council of Lucerne took it out of the hands of the triumvirate and appointed a new commission from its own midst. This commission severely condemned the methods employed towards the teachers who had been called as witnesses, but taking account of the fact that notable additions had been made to the buildings of the seminary, and that great improvements had been effected in the instruction, asked for the discharge of the reference made to it. After a somewhat warm debate, in which the report was characterised as too mild and ineffective, it was accepted.

THE HARMSWORTH ENCYCLOPÆDIA.

FIRST SERIES OF COMPETITIONS.

BY the time this number of the *Practical Teacher* is in the hands of our readers, Parts I., II., and III. of the *Harmsworth Encyclopædia* will have appeared. The issue has aroused great public interest, and the demand for the parts already published has been enormous. It has, indeed, exceeded the most sanguine expectations, and has probably created a record. The publishers daily receive shoals of letters from all sorts and conditions of men and women testifying to the many merits of the *Encyclopædia*, and quite justifying them in their belief that some hundreds of thousands of people were waiting for a work of reference which should be at once accurate, concise, up-to-date, and extremely cheap. We have already described the work as a great contribution to popular education, and have appealed to our readers to assist us in making it widely known. The publishers are grateful for the valuable assistance which teachers have already rendered; and in order to stimulate interest still further, they beg to call attention to the following First Series of Competitions. The competitions announced below are of such a character as to provide interesting occupation for all classes of teachers, and it is hoped that many of our readers will take advantage of them. The Editor will be glad to receive suggestions for future competitions.

CONDITIONS.

(1) The Editor's decision is final.
(2) All competitions must be accompanied by the Coupon cut from the last page (cover) of the *Practical Teacher*.
(3) The Name, School, and Standing of each competitor must appear on every competition sent in.
(4) All competitions must be addressed EDITOR, *Practical Teacher*, 35 Paternoster Row, London, E.C., and be received **not later than May 30, 1905.**
(5) A competitor may send as many competitions as he pleases, but each competition must be accompanied by a Coupon.

SERIES I.

Open to all Readers of the "Practical Teacher."

A. **Post-Card Competition.**—Competitors must write on a post-card the names (*a*) of the four most interesting articles in Part I., (*b*) the four most interesting articles in Part II., and (*c*) the four most interesting articles in Part III. of the *Harmsworth Encyclopædia*. The most interesting articles will be chosen by the votes of the competitors, and the competitors coming nearest to this list will be the prize-winners.

First Prize, £2, 2s.; Second Prize, £1, 1s.

Open to all Certificated Teachers.

B. **Notes of Lesson Competition.**—Two prizes are offered for the best notes of a lesson on any subject selected from Parts I., II., or III., and embodying matter contained in those Parts. The winning Notes of Lessons will be published in the *Practical Teacher;* and the Editor reserves to himself the right of publishing any other competitions sent in, on payment of a fee of 7s. 6d.

First Prize, £2, 2s.; Second Prize, £1, 1s.

Open to ex-Pupil Teachers and Pupil Teachers.

C. **Question Competition.**—Answer the following questions taken from Parts I., II., and III. of the *Harmsworth Encyclopædia*, and in each case give page and article where answer is to be found.

First Prize, £2, 2s.; Second Prize, £1, 1s.

1. Name an important "buffer state."
2. Who was the most celebrated painter of ancient Greece?
3. To whom does Dante refer in his phrase, "The master of them that know"?
4. What are "corkers"?
5. What do you understand by the "Pride of the Peak"?
6. Give some particulars of a celebrated man whose mother was a washer-woman.
7. What was Dryden's greatest political satire?
8. What instrument was invented by Olaus Römer of Copenhagen in 1690?
9. Describe a caschrom, a bolometer, and a seltzogene.
10. What do you know of the "Law of the Innocents"?
11. Of what did the *Spectator* say, "It is impossible to decide whether the inventor of the one or the other were the greater blockhead"?
12. What is common to all Shakespeare's plays?
13. What wood is sometimes called Scottish mahogany?
14. What is the origin of a well-known phrase popularised by Matthew Arnold?
15. What painter prayed while he worked?
16. Name the event associated with Anse du Foulon.
17. What are *paranamirins?*
18. What is Addison's rendering of "Club-law"?
19. What are "plankton" animals?
20. A nervous disease has a medical name which means "fear of the public square"; what is the name?
21. What novelist investigated peat fields?
22. What metal will take up hydrogen in an extraordinary degree?
23. What writer mentions "Xamdu"?
24. What line is quoted in the *Encyclopædia* from Swinburne's "Hymn to Proserpine," and why?

BOARD OF EDUCATION, WHITEHALL.

Examination in Drawing on the Blackboard of Candidates for the Certificate Examination for Teachers of Public Elementary Schools.

SIR,—I am directed to inform you that it has been decided that Candidates for the Certificate Examination shall not be examined in Drawing on the Blackboard at the Drawing Examinations held during April, May, or June, but that arrangements will be made for their examination in that subject at the Centres for the Certificate Examination in July, and as part of that Examination.

I am to request that Managers of Schools and Secretaries of Centres will not accept from such Certificate Candidates applications for examination in Drawing on the Blackboard in April, May, or June, but will inform them that the only step they need take, if they wish to be examined in Blackboard Drawing as part of their Certificate Examination, is to make an entry to that effect on the Fly-leaf to Form 26 which is supplied to them by the Board of Education, Whitehall, when they receive permission to attend the Certificate Examination.

Application from these Candidates for examination in *other* branches of Drawing, or on the Special Courses in Physiography, Biology, or Mathematics specified in the Syllabus of the Certificate Examination, 1905, must be made as directed on page 32 of Regulations for Evening Schools, &c.—I am, sir, your obedient servant,

ROBERT L. MORANT.

February 1905.

OUR CLASSROOM AIDS.

NATURE NOTES FOR THE MONTH.

BY P. HORN.

MAY, THE MONTH OF BIRDS' NESTS.

ACCORDING to popular traditions, the birds select their partners on St. Valentine's Day. Like many another of the old sayings, this curious belief, apparently a pretty superstition emanating from the mind of a forgotten spring poet, is not without a slight foundation of truth. Many of the birds do actually indulge in frivolities when the early February sun deludes them into the idea that spring has returned, but these amateur attempts at love-making, significant though they may be in the eyes of the naturalist, are mere passing courtesies, to be forgotten by the inconsistent swain, as soon as the keen struggle for existence recommences on the morrow.

It is not until March is well advanced that even the hardier of the residents begin to think seriously about the question of housekeeping. Amongst the first to build are the mistlethrush, thrush, blackbird, robin, hedge-sparrow, mallard, and bottle-tit. With the exception of the latter, I have found nests and eggs of all these birds within a few miles of London, before the first week in April. The wild ducks of Richmond Park are particularly early breeders; their nests, packed to the brim with a mixture of olive eggs, and down from the female's breast, often appear before the disappearance of the ice on the ponds.

Later on in the month (April) the remainder of the native birds gradually follow suit in increasing numbers, and to the schoolboy's accumulating strings of empty shells, are added the mutilated productions of the lark, starling, and numerous finches.

May, however, is the great breeding month, and the student who wishes to gain a good average knowledge of the birds' domestic affairs, cannot do better than to plan his excursions at the present time.

First and foremost, all the residents are breeding; some indeed, are sitting on their second batch of eggs. If we watch carefully round the neighbourhood of barns and pigstyes, in all probability we shall see the robin's first brood of speckled progeny bowing and clicking in ridiculous imitation of their elders, who recently drove them from the parental roof.

In May also, we may be certain of finding the nests of the migrants, the last stragglers of which arrive in the first week.

They are now scattered all over the country in their various summer quarters; some have already set up their establishments. Those unfortunate individuals of the sterner sex who are not the proud possessors of a home and patient little wife, will endeavour to remedy the matter as soon as possible. Meanwhile, they hustle each other from prospective building sites, or pipe lustily to their immediate neighbours, and we who understand the signs, know that the most interesting period of the birds' career has begun.

Scientific Bird-nesting.

"Bird-nesting" is a somewhat ambiguous term, and to write on the subject savours of cruelty. The schoolboy and the indiscriminate collector are in a great measure responsible for this state of affairs. In former times they were allowed to harry the birds with impunity; nowadays, thanks to the Wild Birds' Protection Act, the evil has been checked to a slight extent, and few can plead ignorance in the face of the numerous posters which annually appear at this season.

Bird-nesting in its widest and most liberal sense, embraces a wide field of work; it does not necessarily imply collecting of empty shells.

Richard Kearton, R. B. Lodge, and other true naturalists, are all bird-nesters to the modern way of thinking, but their excellent work is certainly free from the stigma of cruelty. Unfortunately, such unique opportunities are withheld from the majority of amateurs, nevertheless it is within the reach of all to learn something in connection with this important period of the birds' life.

Two years ago, the writer was privileged to accompany the members of a local natural history society on a country ramble, personally conducted by an ornithologist, whose book on birds is a recognised standard work. According to the club fixture-card, "Birds" was the subject to be dealt with, with special reference to nests and eggs, but several of the party who had brought out their vasculums, found these receptacles extremely useful during the ten-mile walk through the quiet lanes and woods of Hertfordshire. Owing to the earliness of the season (the first week in May), very few nests of migrants were found, though the party was

graciously permitted to explore private grounds, but in spite of this and other drawbacks, the expedition was unanimously voted a success.

Organising a Ramble.

In these days of field clubs and cheap travel there is no reason why everybody should not participate in a similar expedition.

Personally the writer prefers solitary jaunts, but having had enjoyable experience of several club outings, there can be no harm in giving a few hints for the benefit of others.

Both the organiser and members should be thoroughly in touch, the former capable *and patient*, the latter considerate. Nothing is more irritating to a conscientious conductor than to hear members discussing trivial matters during the course of an important explanation.

When planning a ramble it is advisable to select a locality of which one has had previous experience. Local knowledge is useful in a variety of ways.

From a utilitarian point of view, much valuable time is saved, and a cosy tea-house at the end of the journey has a distinctly encouraging effect on the tired members of the party.

Birds, too, are extremely partial to certain localities, and the conductor whose knowledge of the various woods, water-courses and railway cuttings is extensive, can invariably score, particularly if the neighbouring landowners are friendly.

A small camera is a useful adjunct. Occasionally there are opportunities for a unique snapshot, and the unfortunate photographer who has left his apparatus at home, will rue his forgetfulness for years afterwards.

Lastly, and most important, the field-glasses should be brought.

How to Find the Nests.

There are no fixed rules for the guidance of the amateur.

If we took the trouble to question the average country lad, who is usually an expert in this particular branch of the question, it is doubtful whether a satisfactory answer would be forthcoming.

The secret of his success is due largely to constant practice, and this, coupled with his local knowledge, and a keen, perhaps unconscious observation born of an inherent sporting instinct, enables him to ferret out the unlucky birds with much precision.

A sharp eye and quick ear are essential to success.

Hedgerow nests are easily found by walking in a stooping position along the lower side of the bank, particularly if the sun is shining through from the opposite side. When this course of action is inconvenient, a smart tap with a walking-stick or a stone dropped lightly into the suspected bush will often work wonders. The bird will either fly off openly, or if it does manage to slip away unseen, a barely imperceptible rustle will betray the presence of a nest.

A more interesting and sporting method of finding nests is to watch the birds themselves. The male usually advertises his treasures by singing near the nest, and when, in the intervals of melody, he forsakes his perch and visits a certain spot, we may rest assured that he has particular reasons for doing so.

Bird-catchers, who make a practice of taking the young of the nightingale, have a modification of this method. They watch carefully, and when the cessation of the song denotes that the eggs are hatched, meal-worms are impaled on the neighbouring thorns in order that the parent birds may be tempted to feed their young in public.

Many a nest can be found by observing the demeanour of the old birds. They invariably evince great restlessness when their breeding haunts are approached, and the naturalist who is cognisant of their language can easily understand the secret of their anxiety.

Observations to be Noted.

The observations may be classified under four headings:—

Those connected respectively with—(*a*) Parent birds; (*b*) nest; (*c*) eggs; (*d*) young.

(*a*) When the happy couple has been discovered the exterior sexual differences should be noted. The male bird is usually more brilliantly coloured than his consort, particularly at this season, when his spring finery has lately been assumed by the simple process of a partial moult or shedding of the feather tips. Theoretically speaking, the sombre plumage of the female enables her to escape detection at a critical period.

Amongst other common examples exhibiting these characteristics, are the blackbird, blackcap, chaffinch, yellow bunting, and redstart.

Bird notes are worth a special study. Each species has its own distinctive vocabulary; and before the naturalist can class himself as an expert, he must learn to connect the song with the songster.

The common whitethroat and the lesser whitethroat usually prove puzzling to the novice, who, owing to their similarity in plumage, can seldom identify them with certainty.

The notes, however, are distinctive. The former, which is the commoner, *chatters* excitedly from the hedge; his lesser relative is more frequently found in trees, where, in the intervals of caterpillar-hunting, he gives voice to a rolling *trill*. The beginner should listen for the trill, and then use the field-glasses and indispensable notebook.

Of late I have derived considerable amusement and instruction from articles which have appeared describing how birds make love.

When the bachelor bird desires to enter into a state of matrimony, he naturally endeavours to put on his best behaviour, and curious are the antics which he plays before the object of his choice.

An indignant hen-sparrow surrounded by eight or ten noisy suitors is a familiar town sight, the significance of which few understand properly. The graceful nuptial flight of the turtle-dove, the persistent wooing of the blackbird, and the masterful advances of the gorgeous pheasant are all acts in the drama of bird life. In a few weeks they will be over for a space.

(*b*) (*c*) To delve deeply into the matter of nests and eggs is impossible in this limited space. Students who wish to learn more about this interesting question can only do so by visiting the birds in their native haunts.

Knowledge practically gained is seldom forgotten, and under the guidance of the directions given above, the town enthusiast, aided by the various museums, can soon become as expert in distinguishing nests and eggs as his fortunate brother-naturalist in the country.

(*d*) Under this heading the growth of the feathers is the most notable feature.

The young of most birds are born comparatively naked.

At the age of a few days, the position of the coming feathers is indicated by numerous well-defined lines or "tracts," with intervening spaces of bare skin upon which no important feathers will ever grow.

When the feathers first make their appearance, they

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are wrapped in a tight-fitting skin, and the subsequent disintegration of this covering results in the gradual formation of the bird's coat.

For further particulars as to feather growth readers are referred to a detailed article which appeared last June.

An Answer to a Scholarship Question.

At the last Scholarship Examination the country pupil teachers were provided with an excellent opportunity of distinguishing themselves.

Amongst the general papers was a question which ran as follows:—

"Describe *briefly* the nesting-place, nest, and eggs of *four* of the following":—Chaffinch, skylark, wren, wood-pigeon, mistle thrush, landrail, and partridge.

With the sanction of the Editor, we will endeavour to answer the question, keeping to the stipulations as far as possible under the circumstances.

(1) Chaffinch.

Nesting-place.—Hedgerows; usually constructed in the fork of an old hawthorn. Sometimes attached to the lichen-covered bough of a fruit-tree, at a distance of six or seven feet from the ground.

Nest.—Cup-shaped, and compactly woven from moss and fine grasses. One of the most beautiful of British nests. The lining consists of feathers and hair from the tails of cattle, whilst the outside often harmonises with the supporting branch by reason of numerous pieces of moss and lichen worked into the exterior.

Eggs.—Four or five. Ground colour difficult to describe. Pale drab or stone, flushed variously with a pinkish brown, or green tinge, and speckled with a few purple blotches.

(2) Skylark.

Nesting-place.—Pastures and grassy fields, in any slight depression of the ground. Usually hidden from sight by a shadowing tussock of grass.

Nest.—A cup composed of grass and rootlets.

Eggs.—Four. Apparently uniform grey or brown. On closer acquaintance it will be found that the ground colour is a dull white, the predominating tint being due to the close pattern formed by the numerous brown mottlings.

(3) Wren.

Nesting-place.—Various. Thick bushes and herbage, holes in banks, stumps, under the thatch of barns. A favourite site is the thick ivy growing on old trees.

Nest.—A hollow spherical structure six inches in diameter, composed of moss, rootlets, grass, and dead leaves, with a tiny aperture at the side.

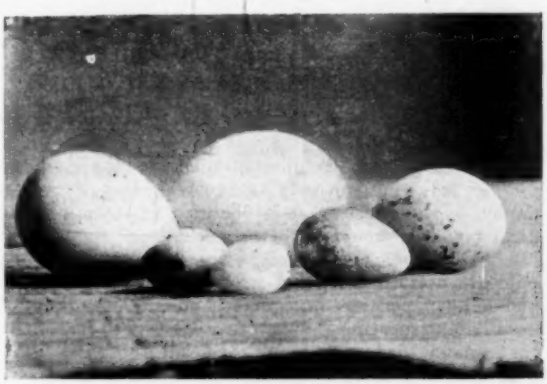
The roomy interior is lined with soft feathers. The nest is usually difficult to find owing to the ingenious manner in which the bird covers the exterior with various materials in order to make it harmonise with the prevailing surroundings. Where dead leaves abound, the nest is ornamented accordingly. The nest is seldom placed at any great height from the ground.

Eggs.—Six or eight, naturally very small. Pure white, speckled more plentifully at the thicker end with minute red spots.

(4) Wood-Pigeon.

Nesting-place.—Wood, fir plantations, and unfrequented orchards.

Nest.—A mere rudimentary platform of twigs and coarse roots, placed across a convenient flat bough at a distance of ten to twenty feet from the ground. Some-



By permission of the Stepney Borough Museum.

times it is built in a main fork. Under the former circumstances the eggs are often discernible through the flimsy structure.

Eggs.—Invariably two. Pure glossy white, with no markings whatever. Rather larger than those of the average domestic pigeon.

All the eggs, with the exception of that of the corncrake, are shown in the accompanying photo. To the reader who wishes to appreciate their beautiful colours, I recommend a visit to South Kensington; in default, the illustrated works of Seebohm and Morris will prove of service.

Next month.—"*The Breeding Cage in June.*"

PRACTICAL HELP IN THE ARITHMETIC LESSON.

BY GEORGE COLLAR, B.A., B.SC.,
Joint Author of "A New Arithmetic."

IN spite of the great convenience offered by "practice" as a method of calculation, it is a rule that does not receive nearly as much attention as it deserves. This may possibly arise from the fact that the pupils do not grasp the facts: 1st, that an aliquot part is the simplest fraction of a quantity that we may have to calculate; and 2nd, that any fraction may easily be resolved into the sum of a number of aliquot parts of the whole, which are also frequently aliquot parts of one another.

An aliquot part is a fraction whose numerator, when the fraction is in its lowest terms, is unity, *e.g.* $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{7}$, $\frac{1}{15}$, but $\frac{2}{3}$, $\frac{3}{4}$, $\frac{2}{7}$ are *not* aliquot parts. It follows from this that an aliquot part of anything is found by one operation, viz. division, whereas any fraction, not an aliquot part of anything, involves two processes—multiplication and division.

Few rules in arithmetic serve to distinguish the intelligent student from the merely mechanical one so readily as practice. The intelligent student shows his skill by taking the smallest possible number of aliquot parts, while the mechanical one plods along laboriously through a long string of them.

Practice then offers the teacher an opportunity of training his children's intelligence by showing them how to find the smallest possible number of aliquot parts whose sum will be equal to a given fraction.

The method of finding the required parts consists of setting out all the possible divisors of the denominator of the given fraction, and then by trial selecting those divisors or factors which give the numerator as their sum in the smallest number of terms.

Example.—Represent the following fractions as sums of aliquot parts: $\frac{7}{20}$, $\frac{13}{32}$, $\frac{11}{12}$, $\frac{9}{10}$, $\frac{17}{28}$.

(*a*) Now the divisors of 20 are 1, 2, 4, 5, 10, 20. Of these we can make 7, by taking $4+2+1$, or by taking $5+2$, and the latter should be preferred because the number of aliquot parts is only two instead of three. $\frac{7}{20}=\frac{5}{20}+\frac{2}{20}=\frac{1}{4}+\frac{1}{10}$. It should be noted that in this case each fraction must be taken directly as an aliquot part of the whole.

(*b*) The divisors of 32 are 1, 2, 4, 8, 16, 32, and it requires three of these to give 13 as their sum, viz. $8+4+1$. $\frac{13}{32}=\frac{8}{32}+\frac{4}{32}+\frac{1}{32}=\frac{1}{4}+\frac{1}{8}+\frac{1}{32}$, and from the numerators of the unreduced fractions it is evident that these might have been written $\frac{1}{4}+\frac{1}{8}$ of $\frac{1}{4}+\frac{1}{4}$ of $\frac{1}{4}$, so that in working we should have to divide by 4, 2, and 4.

(*c*) The divisors of 28 are 1, 2, 4, 7, 14, 28, and we can make up 11 with 7 and 4. $\frac{11}{28}=\frac{7}{28}+\frac{4}{28}=\frac{1}{4}+\frac{1}{7}$. We have seen some very strange combinations adopted to express 11 lbs. in aliquot parts of a quarter.

(*d*) As a rule, when the fraction is greater than a half, the best plan is to find the aliquot parts that make up the complement. Thus $\frac{9}{10}=1-\frac{1}{10}$. Hence we subtract $\frac{1}{10}$ of the quantity from the whole, or if there is a whole number associated with the fraction we must increase this whole number by 1, *e.g.* $7\frac{9}{10}=8-\frac{1}{10}$.

Example.—Find the cost of 478 tons at £7, 18s. per ton.

2s. $=\frac{1}{10}$ of £1	£478		cost at	£1	0	0	per ton.
	8						
	3824	=	,,	£8	0	0	,,
	47 16s.	=	,,	0	2	0	,,
	3776 4s.	=	,,	£7	18	0	,,

(*e*) A few schools may be found in which the pupils have been taught to use the above method, if the fraction falls short of unity by *one* aliquot part, but very few indeed use the method if the fraction falls short of unity by *more than one* aliquot part. But yet it is extremely simple if subtraction has been taught as "complementary addition." In finding the aliquot parts which make up $\frac{17}{20}$, we notice that the factors of 20 are 1, 2, 4, 5, 10, and 20. By ordinary addition we should have to take 10, 5, and 2 to make 17, but it needs only 2 and 1 to make up the difference or complement.

Example.—Find the cost of 5 tons 17 cwt. at £2, 5s. 0d. a ton.

2 cwt. $=\frac{1}{10}$ of 1 ton	£2	5	0	= cost of 1 ton		0 cwt.	
			6				
1 cwt. $=\frac{1}{2}$ of 2 cwt.	£13	10	0	= ,,	6 tons	0 cwt.	
		4	6	= ,,		2 ,,	
		2	3	= ,,		1 ,,	
	£13	3	3	= ,,	5 tons	17 cwt.	

We have to see what must be added to the cost of 2 cwt. and of 1 cwt. to make the cost of 6 tons, for this is evidently the cost of 5 tons 17 cwt.

The mental work is as follows:—

6d. and 3d. are 9d., and 3d. make 1s. (carry 1).
1s. + 2s. + 4s. = 7s., ,, 3s. ,, 10s.
Nothing ,, £13 ,, £13.

In dealing with the cost of a fraction children should not be taught to work this out separately and add the result at the end, but to put the value of the fractional part in the top line. Thus in finding the value of 478¾ at £7, 15s. 4d. the pupil should begin by writing—

£478, 13s. 4d. = cost at £1.

It is an open question whether children should divide to fractions of a penny other than halfpence and farthings, or should set down the result in each line to the nearest farthing and either note down or reject the remainder.

On the one hand, if fractions are taught before practice, children find no difficulty in obtaining the exact result; this is a training in accuracy; and lastly, in dealing with classes it has the advantage of enabling all who have worked accurately to arrive at the same result, but if the divisions are made to the nearest farthing, the results will often vary with the different sets of aliquot parts taken by the children, although each may have done his calculations correctly. On the other hand, practice is essentially a commercial rule, and so it is advisable that the method taught in school should be the method used in trade, and in no trade is notice taken of fractions of a penny other than the halfpenny or farthing, and it should be noticed too that if the price of anything does not come to an amount that can be paid by coin of the realm, the price is in practice adjusted by increasing it, not by neglecting the small fraction of a penny.

The teacher should train the children to take advantage of the similarity between the money table and others, and use "simple" practice in cases in which many people use "compound."

Example.—Find the cost of 25 tons 7 cwt. 3 qrs. at £4, 12s. 6d. per ton.

Children should notice that £1 per ton = 1s. per cwt. = 3d. per qr., hence we write down—

10s. $=\frac{1}{2}$ of £1	£25	7	9	= cost at	£1	0	0	per ton.
			4					
	£101	11	0	= ,,	£4	0	0	,,
	12	13	10½	= ,,	0	10	0	,,
2s. 6d. $=\frac{1}{4}$ of 10s.	3	3	5¾	= ,,	0	2	6	,,
	£117	8	4¼	= ,,	£4	12	6	,,

Again, it is useful to remember that £1 per acre = 5s. per rood = 1¼d. per sq. per., and so the price of a given piece of land can be written down at £1 per acre; *e.g.* 12 ac. 3 rd. 12 per. at £1 per acre = £12 + 15s. + 1s. 6d. = £12, 16s. 6d.

The value at any other price per acre can then be easily found from the value at £1.

"DEAR SIR,—We beg to call your attention to the fact that we have purchased from Messrs. George Routledge & Sons, Limited, of Broadway House, Ludgate Hill, E.C., the following Series of Reading Books:—

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THE TEACHING OF COMPOSITION.

THERE is no more valuable subject in the school curriculum than Composition. Experience acknowledges the value. Yet it is doubtful whether there is any subject the teaching of which receives so little scientific attention.

It may be that the great masters of literary composition received no formal lessons in the technique of their art. It may be that a natural ability, acting through a distinct and peculiar temperament, or influenced by surroundings more or less in harmony with that temperament, has grasped instinctively the conditions necessary to success. It may be so! But, on the other hand, we know that many, whose accomplishments rank high in the estimation of the world, have reached their positions only after long and serious training. The result is seen; not the preparation. Wherever there is success there is preparation — quiet, systematic, continuous — that selects and casts out what is weak, while it strengthens the already strong.

Does the study of composition in the majority of our schools proceed on this fundamental principle? We are afraid it does not. The instruction is often of a haphazard character, without distinctive feature or direction. The common plan, when the time for the lesson comes round, is to require the scholar to write an essay on a subject with whose matter he has some familiarity, or, in the case of the younger children, to reproduce in their own words the substance of a short story which the teacher has read to them. Occasionally the exercise rises to the level of a paraphrase of a selected passage—usually of poetry. The exercises are then collected and marked. If the sequence of facts is correct, the words spelled correctly, with an absence of gross grammatical errors, the teacher usually accepts the work as satisfactory. As the exercise is frequently marked away from the scholar, often after a considerable interval, when the memory of his efforts have become dimmed, all that he realises of his work is that he has made certain grammatical errors and has been awarded a mark as value.

This is the end in many cases. The better teachers make notes of weaknesses, and at a suitable opportunity use them for the purpose of teaching. It is, however, only the commoner and more general faults that can be thus dealt with, and often only in a general way. Such a lesson has some value, but the individual does not appreciate its relation to his personal efforts: he may have learned a new fact, grammatical or otherwise, or have seized completely something which he had previously but imperfectly grasped; but as regards the improvement of his powers of composition there is no advance. To be of real value such teaching must be individual. It is then only the teacher really has his opportunity. It is then the influence of his own enthusiasm, and knowledge, and personality can be brought to bear upon the impressionable individuality of the scholar. He can explain the error, point out the weakness, appreciate all that is strong or beautiful, and indicate the road to success. But how often does this take place?

The object of language is, primarily, the expression of our wants. In infancy, both with men and nations, the wants are few and simple, the forms of expression no more extensive than the wants. Uncertain sounds indicating things mark the first efforts; other sounds associated with actions are the next to follow. With later growth and increased needs, both physical and psychological, making definite demands and requiring clearer expression, come qualifying words and differentiating forms. The scanty but adequate monosyllables of the early age, often nothing better than a mere grunt, rude as the character and habits of the primitive race, expand by gradual additions until they become the copious and elegant flow of sound that is characteristic of the highest civilisation. Human society is to-day too complex for the monosyllabic grunt to be sufficient for the purpose of supplying its daily wants, and quite unsuited to bring the mind of man into intimate touch with that of his fellows. To secure this result requires the most careful selection and arrangement of the words at command, and is the object to be kept in view in the subject of Composition. The machinery must be drawn from the store that the past has provided; the material lies around us. Style is the personal manner in which the two are employed.

A writer on this subject in the early years of the last century remarks: "All that can be demanded of language is to convey our ideas clearly to the minds of others, and at the same time to clothe them in an advantageous dress. The two general heads of perspicuity and ornament, therefore, comprehend all the qualities of a good style. Perspicuity demands our chief care; for, without this quality, the richest ornaments of language only glimmer through the dark, and puzzle, rather than please, the reader. An author's meaning ought always to be obvious, even to the most careless and inattentive reader; so that it may strike his mind as the light of the sun strikes his eyes, though they are not directed towards it." Each writer must study, not only that every reader may understand him, but that it shall be impossible for any reader not to understand.

It has been said that the machinery of composition has been prepared for our use in the experience of the past, and has been collected for us in the rules of grammar and syntax. Purity of style may justly be denominated grammatical truth; — the opposite to logical truth is an error; to moral truth, a lie; to grammatical truth it is a solecism. The only authority for grammatical truth is the authorised, national, and present use of the language. The necessity for a grammatical study of the language is lessened to some extent by surroundings and by the reading of the works of first-class authors; but there is nothing that completely takes its place. The spoken language frequently lacks purity, and has a tendency to become slangy in character. The degeneracy must be prevented, and hence the necessity of a standard of reference such as the rules of grammar supply. The fact that authors of repute frequently make grammatical errors is no argument against the necessity; there is nothing gained by such errors, and consequently there is no excuse for culpable carelessness.

It follows from the above remarks that composition exercises will divide themselves into two classes—(1) Exercises for the development of style, which shall give the student opportunity for using his own material in the way best suited for obtaining a desired result; and (2) exercises designed for the promotion of accuracy in the use of language, viz., Grammatical or Technical Exercises. The first set, which we will call Personal Exercises, and which will continually benefit from the knowledge gained in the Technical Exercises, should be looked upon as the means by which the pupil is to arrive at his intellectual maturity

—the growth from within which absorbs all the food that is supplied, and having assimilated it, pushes forward with renewed vigour. This section of the work will deal with the value of words as regards their ability to express, by selection or arrangement, the purpose of the writer, or the character of the subject under consideration. Free play to the imagination must be allowed even though such freedom leads to excess. It is easier to restrain than to create. Every effort to be original should be encouraged, provided the originality has a definite object in view. Happy thoughts, clearness in statement, logical connection, excellent choice of words or harmonious phrases, accurate descriptions, all should be noted, even though bad spelling and other faults may take value from the exercise. In fact the right selection of a word should be allowed at times to compensate for a slight error in spelling, especially if the word selected is peculiarly appropriate. Gradually the various figures of speech may be introduced, and examples having been studied under the guidance of the teacher, the pupil may be called upon to imitate in his own exercise the model he has had before him. The final stage will be reached when the pupil can be set to study the style of an author for himself. Such author will be appreciated in just the proportion as the student is able to analyse the character of that author's work, while the influence of the author upon the student's own style will be in direct proportion to the degree of the latter's appreciation.

Much more could be said as to the extent and character of these personal exercises. But that must wait. To secure the amount already indicated the Technical exercise is a necessity, but it should only consume a portion of the allotted time. It deals with the machinery of the Personal exercise, and cannot be ignored if success is desired. Unfortunately there is reason to believe that this essential part of the work is not as scientifically taught as it ought to be. No teaching of composition can be free from the knowledge that the Technical exercise gives, the character of which varies at every stage of progress.

The number of exercises by which grammar and syntax can be taught as a part of composition is practically unlimited. For those teachers who have not considered the two together a few types of exercises are suggested below. Those described will each suggest others.

1. Re-writing in another person, or tense, or both, a story previously read.
2. Re-writing with a change of voice.
3. Re-writing a story from another point of view, *e.g.* the Fox and the Crow, when the Crow tells the story.
4. Combine a number of simple statements into compound or complex relation, giving practice in use of conjunctions, relative pronouns, and other connectives.
5. Expansion of simple adjectives and adverbs into subordinate clauses.
6. Change of a direct narrative into the indirect form, and *vice versa*.

The points just suggested can be applied to almost any subject. The use of a story as a basis for composition exercises has been widely adopted, largely through the influence of the instructions in former Education Codes. The chief value of the story is in its supply of information, which in a competitive examination places all the candidates upon the same level of facts; but the plan has its disadvantages, one of which is that in the reproduction, the memory plays too great a part, for children are found in the majority of cases to show a tendency to reproduce, word by word and phrase by phrase, those used in the original. It is sounder educational policy to encourage the play of the imagination, and, even though securing less accuracy, give the child an opportunity of expressing *himself* and thus strengthen him in his progress along the path of individual development.

NOTES OF LESSONS ON FUNGI, PARASITES, AND CARNIVOROUS PLANTS.

Class.—Although the lessons here outlined are intended for the upper standards, yet if given in simple language the matter will be found suitable and interesting for younger children also.

Time.—Two lessons of thirty minutes each.

Object.—To investigate some of the more uncommon methods of obtaining nourishment adopted by some forms of plant life, and to lead the children to take a deeper interest in the vegetable kingdom than mere appreciation of scent and colour. The humblest plant hidden away in the depth of the wood should prove an object of interest, and teach some lesson to the inquiring mind.

> "For who so readeth Nature's book
> Wide spread throughout the earth,
> Will something add unto his love
> Of wisdom and of worth."

Step I. Preparation.—Recapitulate what has already been taught on the subject of plant food, emphasising the point that plants require water, nitrogenous salts, and carbon; the first two being obtained as a rule from the earth by means of the roots, and the latter from the carbonic acid gas in the air, which is decomposed by the chlorophyll in the leaves.

Step II. Presentation.—One of the chief points of distinction between the members of the animal and the vegetable kingdoms is the nature of the food they require. Plants are able to build up their substance out of very simple materials, but animals cannot live on these simple substances until they have been built up into more complex forms, either by plants or by plant-eating animals. But, although this distinction holds in a general way, there are many cases of plants which cannot build up their tissues out of these simple materials, but require the necessary preparation to be done for them.

These may be divided into three classes: (1) Saprophytes, that subsist on decaying vegetation; (2) Parasites, that attach themselves to living objects; (3) Carnivorous plants, that obtain their nitrogenous matter by turning the tables on the animal world and preying upon insects.

1. *Saprophytes.*—The darkest corners of the wood, where the dead leaves and fallen branches lie rotting on the ground, will give us a plentiful crop of saprophytes. Most of the members of this class are Fungi, yellow, crimson, brown, and many other hues and shades, but never by any chance do we find a green

one. This is only another instance of the marvellous way in which Nature adapts her creatures to the particular conditions and circumstances in which their lots are cast. If we remember what we have learned about green leaves and their function, we shall see at once how useless green chlorophyll would be to a fungus in this dark shady corner of the wood, where the sunlight hardly ever penetrates. Since the chlorophyll only acts in the presence of sunlight, the plant would be starved if it had to depend on this means of obtaining sustenance, but it is able to get its food from the decaying vegetation to which it is attached, and in this respect it may be compared to the jackal, or the Eastern dog, in acting as a scavenger by removing decaying matter, thus rendering harmless and even picturesque what would otherwise prove a source of evil.

2. *Parasites.* — We now come to a class of plants which is extremely interesting to study, although we feel we ought to despise them for the manner in which they live. We know, unfortunately, there are some people who, instead of working to gain an honest livelihood for themselves, subsist on the result of other people's labour; we may observe the same bad habit in certain animals, and now we find plants doing exactly the same thing.

When you find the bright little Yellow-rattle or the Red Bartsia among the grass in the meadow, you would hardly suspect them of being bad characters; but there seems to be little doubt that they fix themselves to the roots of the grass, and so rob the latter of the nourishment it has obtained for its own use. It is difficult to detect them in the act, but if we try to grow either of them away from their grassy surroundings, they are always stunted little things only reaching an inch or so in height.

Search about in a clover field, or on a gorse-covered common, and you will probably find the Broom-rape with its pink or purple flower somewhat resembling the Dead-nettle in shape. This is another little robber, for it fixes itself directly on the root of the clover or gorse, and obtains all the nourishment it requires without any exertion on its own part.

Another sad robber is the Tooth-wort, which you may find at the foot of the elm, the hazel, or the ash. This bears large whitish flowers somewhat like the Broom-rape, which springs straight out of a mass of tooth-like scale-leaves. On scraping away the earth we find these scale-leaves end in a fibrous mass of tiny rootlets, which fix themselves to the root of the tree by means of tiny suckers, thus enabling the Tooth-wort to live at the expense of its host. Should the Tooth-wort be unable to find a living root to rob, it is able to adapt itself to circumstances, and to draw its nourishment from dead vegetation, hence it is often classed as a saprophyte, but as a matter of fact it is either. Another and perhaps better known parasite is the Dodder. This plant belongs to the Convolvulus family, and, like the convolvulus of our hedge-rows, it twines itself round some plant for support. But, unlike the convolvulus, it is not content simply with support, for wherever it touches the plant it develops a number of minute suckers, by means of which it robs its host of the sap which its own leafless stem is unable to manufacture.

But the monarch of all parasitic plants is the Mistletoe. This is familiar to every one on account of the traditions that have grown up around it. When we think of the nature of the Mistletoe, we can understand the peculiar veneration with which it was regarded by the Druids, for since it does not obtain its nourishment from the ground by means of a root like other plants, a barbarous and superstitious people like the ancient Britons would very naturally conclude that there was something supernatural in its growth. We know, however, that there is nothing supernatural about the mistletoe, the mystery of its growth being explained by the fact that it is a robber, and lives on the sap it obtains from its host. We all know how sticky the interior of a mistletoe berry is; this enables a seed to adhere to a tree until the radicle has taken a firm hold. When we plant a seed in the ground it does not matter how it happens to lie, the radicle always grows *downwards*, but the radicle of the mistletoe seed always grows towards the body to which the seed is attached; so, if the berry sticks to the under side of a branch, the radicle will grow *upwards* toward the branch. The radicle pierces the bark and enters the wood of the tree, where it spreads out its tiny fibres in all directions, thus obtaining a firm hold. The mistletoe, however, does perform some work for itself, as it sucks out not only the perfect sap that is descending from the leaves, but also some of the crude sap that is ascending, and this it prepares for itself by means of the chlorophyll in its own leaves.

3. *Carnivorous Plants.*—The most common member of this class is the Drosera, or Sundew, as it is popularly called. This is found growing in profusion in marshy ground, and consists of five or six leaves lying close to the ground, arranged somewhat in the form of a rosette. Although the leaves are green they seem to have a reddish tint, but a close examination shows that this is due to a number of reddish-purple hair-like processes with which the leaves are thickly covered. These processes or tentacles secrete a sticky liquid, tiny drops of which are generally seen at the tips of the glands, and have given rise to the popular name of Sundew. When an insect alights on a leaf it becomes entangled in the sticky secretion, the edges of the leaf turn inwards, and the tentacles bend over until the victim is held fast on all sides; its struggles to free itself only serve to excite the glands, which pour out more secretion. In about a quarter of an hour the insect is dead, and then commences a process of digestion exactly similar to that which goes on in the stomach of an animal, and at the end of five or six days there is nothing left but the wings and the harder portions of the insect's body. When the leaf uncurls itself its surface is dry, for the glands have been absorbing the digestible portion of the insect instead of secreting adhesive fluid, so the wind soon carries away the undigested parts, and then the Sundew waits for another victim.

Step III. Association.—Although plants do not possess intelligence, and simply carry out Nature's laws, we cannot help applying our own code of morals to them. This not only gives additional interest to the subject from a child's point of view, but also affords an opportunity of impressing a few moral lessons on the childish mind.

Thus we are apt to despise the saprophytes because they always spring up in the midst of corruption and decay; but we must learn to value things for what they do to make the world better and brighter, and not for their accidental surroundings. The Red Bartsia, the Yellow-rattle, and the Dodder, are much

more attractive than the Fungi; but how we ought to despise a Parasite! What is more contemptible than a creature that will not work for itself, but, as the name is literally rendered, "eats his food at another's table"?

Step IV. Formulation.—1. Plants as a rule live on very simple substances, but animals require more complex forms of food.

2. Some plants cannot form their tissues from simple materials, but require these materials to be elaborated for them. These are divided into three classes: (1) Saprophytes; (2) Parasites; and (3) Carnivorous Plants.

3. Saprophytes live on decaying vegetation; this class includes most Fungi and a few Orchids.

4. Parasites fix themselves to other plants, and live on the sap prepared by these plants for their own use. The plant to which the parasite is attached is called the host. Chief parasites are: Red Bartsia, Yellow-rattle, Tooth-wort, Dodder, and Mistletoe.

5. Carnivorous Plants, such as the Drosera or Sundew, entrap insects and digest the softer parts.

Step V. Application.—The application of the truths imparted in these lessons will take various forms.

1. The more the child learns of the beauty of every form of life, the stronger will the love of Nature grow, and even the smallest and humblest creatures will prove to be objects of interest.

2. These plants may be made to illustrate moral truths, and to lead the children to respect honest independence, and to despise those that sacrifice their self-respect and live by trading on the weaknesses of their fellow-men.

OUR ILLUSTRATED GEOGRAPHICAL NOTEBOOK.

THE IMMIGRANT ASIATIC.

The Coolie Abroad.

THE Chinese are the most remarkable people in the world. Their empire is 4400 years old; it was known to the ancient Egyptians, Greeks, and Romans as possessing a vast people, civilised and peaceful; it has a written history distinct and trustworthy as far back as 700 years before the Christian era. The magnetic compass, block-printing, and gunpowder were known to the Chinese while our ancestors, skin-clad and woad-stained, roamed over Britain in a state of savagery. Yet in the "Happy Land of Standstill" early opportunities were neglected, the people with fanatical repugnance persistently resisted modern progress, and even now all but the fringe of China is a sealed book to Europeans.

China is estimated to contain 400,000,000 of people, more than the whole population of Europe, or about one-fourth of the inhabitants of the entire globe. There is a fascination in the contemplation of such a huge number, and Western peoples have long speculated as to what might happen if China should rouse from its long slumber through the ages. The startling rise of Japan brings to the fore the "Yellow Peril," the possible supremacy of the yellow man over other races; and an examination into the various aspects of the question may provide matter for interesting consideration.

Asiatics Abroad.

Country.	Chinese.	Hindoos.	Japanese.	Not Specified. Hindoos and Malays Chiefly.
United States. . .	90,167	...	24,610	...
Canada	17,300	...	...	...
Jamaica.	480	11,830	..	...
Trinidad	...	87,658	...	...
Leeward Islands. .	...	...	...	23,320
British Guiana . .	3,715	105,000	...	...
Dutch Guiana . .	...	14,000	...	...
Siam	4,000,000	...	...	...
Malay Peninsula .	585,000	110,000	...	...
Java, &c.	460,000	...	.	...
Mauritius	3,226	209,070	...	...
Reunion	836	15,210	...	...
Cape Colony (1891) .	...	...	...	13,907
Transvaal	37,000 (1905)	...	...	5,759 (1896)
Natal.	...	...	...	74,385
British East Africa .	...	...	...	25,000
Zanzibar	...	...	...	10,000
New South Wales	10,220	1,680	161	..
Queensland . . .	8,587	939	2,269	...
Victoria.	6,350	790	55	...
South Australia . .	3,360	440	205	...
West Australia . .	1,520	830	860	...
New Zealand . . .	2,860	...	...	..
Fiji Islands . . .	17,100	...	...	...
Hawaiian Islands .	25,700	...	62,000	...

The Yellow Peril.

The "Yellow Peril" has been defined by *The Times* as "the fear that the ascendency of China will follow the ascendency of Japan, and that a generation or two hence Europe will stand face to face with a yellow confederacy able to put into the field five or six millions of men as brave, as well disciplined, and as well armed as those whom we have been watching as they stormed the Manchurian heights and drove the Russian regiments out of their last defences."

At the very outset this fear may be largely dismissed as an impossible bogey, a baseless dream. The Chinese do not possess a single characteristic that within half a century raised Japan into one of the great world powers. The Japanese exhibited a phenomenal imitativeness, and immense sacrifices were cheerfully made to enlist in the service of the nation every useful point in Western civilisation. In China whatever little progress has been made, even in the provinces most under foreign influence, has only been accomplished by pressure from without. In Japan reformation was the result of inborn motive within. China is of vast extent, practically without roads, railways, and telegraphs, occupied by peoples widely separated in speech and interests, and bound together only by colour and a

COMMON HATRED OF THE "FOREIGN DEVIL."

Even if the desire to emulate Japan existed, these racial and transport difficulties alone would prove barriers, to overcome which would require an initiative and an enthusiasm the hope of which the past history of the Chinese apathy and conservatism seems to forbid.

But though the Chinese have ever sternly resisted the entrance of foreigners into their country, they have exhibited a remarkable aptitude for overflowing their own borders, and the Celestial is found competing for

a share in the labour and wealth of regions far removed from the flowery land of Cathay. It is impossible to give anything like a complete total of the Chinamen outside their own country, for in many cases there are no statistics available; but the following authentic figures, chiefly for 1901, and the accompanying sketch-map will show that

JOHN CHINAMAN IS A COSMOPOLITAN

far beyond what his outstanding trait of exclusiveness would lead one to suppose. In the last few years the Japanese have shown a taste for service abroad, but the restrictive laws leave now but a few regions out of which to make a choice.

The Chinese Immigrant.

The Chinaman is not an ideal colonist in the eyes of white people. Though he is industrious to a degree, he is thrifty to miserliness; he is domesticated in habit, but often filthy in habit and person; he is polite in manner, but is deceitful and dishonest; he is a vegetarian, but very frequently an opium drunkard. He seems wholly indifferent to climatic conditions, and wears a cotton shirt in Arctic cold or tropical heat; he can do with as little sleep as a dog; he will work all day and as far into the night as moonlight will allow. Whatever wealth the Chinaman may amass he takes it home to spend, and even in case of death he arranges for his bones to be laid to rest in the land of his birth. Some of his characteristics are so repugnant to white people that restrictions have from time to time been placed upon Chinese immigration. It may be that the average immigrant is by no means the best type his race affords, for the Chinaman at home possesses many personal traits that are to his credit.

The Chinese in Southern Asia.

There is little wonder perhaps that following the line of least resistance the Chinese should bulk largely in the population of Siam, where the people are mainly of the same stock. The Siamese are a gentle, cheerful, timid, and careless people, almost threatened with extinction, so great is the influx of their more virile neighbours. Quite four-fifths of the population of Siam is distinctly Chinese. The Chinaman enters the country in hordes, takes to himself a Siamese or half-breed wife, and when he returns to China frequently leaves his wife and family behind.

To grasp the possibilities of

CHINESE EXPANSION

one must go to Malaysia, for here the Chinaman is supreme. The Malay is physically weak, and he simply detests labour of any kind; the Celestial, on the other hand, revels in work, providing there is profit at the end of it. In the tin mining industry he is head and shoulders above the Malay, whom he outnumbers by ten to one; only Chinese labourers are worth their hire, and Chinese employers are practically the only ones who find the industry profitable.

But it is in Singapore itself that the apotheosis of the yellow man is most complete. In this emporium of the Eastern world, the chief port on the route from India to the Far East, the centre of the Eastern telegraph system, John Chinaman is of paramount importance. He is the shopkeeper *par excellence;* he is adept in all manual occupations; and, above all, he is the mainspring of the vast commercial interests of one of the busiest ports in the British Empire. He owns warehouses, he runs mills and factories, he controls steamships, and even the banking business is largely in his hands. In the cool of the evening gorgeously attired Celestial merchant princes may be seen driving out with their European wives behind high-stepping horses, with knee-breeched footmen in attendance. The European wife at any rate scarcely seems in consonance with the Kipling dictum,

"EAST IS EAST, AND WEST IS WEST, AND NEVER THE TWAIN SHALL MEET."

The predominance of the Chinese in the Straits Settlements under certain conditions might prove an embarrassing factor in the government by a mere handful of British officials. But the Chinese are placed at an immense disadvantage in that their varying dialects, for they are drawn from all parts of the Chinese empire, prevent almost the possibility of any really concerted movement against the authorities.

The Chinese in South Africa.

The South African war is said to have dislocated the native labour market, and after the declaration of peace the Rand mine-owners experienced difficulty in procuring natives to work in the mines at the former rate of pay. A Labour Commission was appointed to inquire into the labour requirements of the Transvaal, and in due course reported that the "progress of every industrial enterprise in the Transvaal is arrested by the want of labour." It was calculated that the mining industry already required an additional 129,000 labourers, and within the next five years another 200,000 would be needed; agriculture showed a shortage of 50,000, and railway work 40,000. The Labour Importation Ordinance, 1904, allowed the employment of Chinese under certain definite regulations, of which the more noticeable are:

1. Only licensed persons allowed to recruit Chinese labour.
2. At the end of the contracted service the labourers are sent home at the importer's charge.
3. The immigrant can terminate his contract by paying the cost of transit both ways.
4. Every labourer must be vaccinated before entering the country.
5. The labourers may be accompanied by their wives and children under ten.
6. The labourers are provided with free rations, housing, fuel, water, and medical attendance.

The decision to import Chinese labour gave rise to bitter discussion both in South Africa and at home. This present article cannot discuss the merits of the dispute, and can only describe matters as they exist at the present time. There is evidently in South Africa no real antipathy to Asiatics on account of their origin alone, for the census of Cape Colony, 1891, gave nearly 14,000 Malays, while in Natal there were 70,000 Hindoo coolies. The chief objection appears to be directed against the avowed intention of bringing in large numbers of Chinese to undersell native or unskilled white labour. The Celestials are lodged and fed in compounds, in addition to which they receive

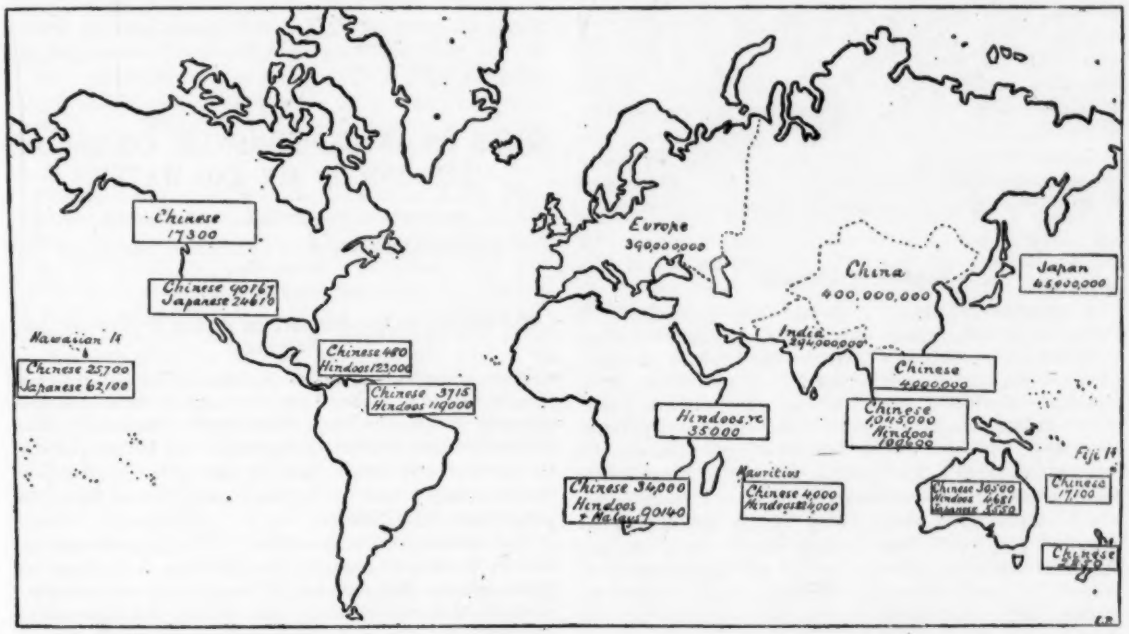
ONE SHILLING PER DAY.

A visitor to one of the mines a few months ago gave a rather unfavourable report of John Chinaman. On

that particular day, out of 1005 Chinese, 65 were in hospital, and 197 had not chosen to work. With Oriental astuteness the new miners had grasped that the mine-owners were willing to grant concessions altogether outside the contracts, to ensure smooth working and to disarm criticism. Special brands of dried mushroom, a Chinese delicacy, were asked for and duly provided, as was an egg each man for breakfast on another occasion, although eggs were 3s. 6d. a dozen. If Kaffirs asked for such consideration they would be deemed flagrant examples of man's ingratitude to man. Only a few weeks ago 2000 Chinese at one mine struck work, and a general riot took place, which was only quelled by lodging a score in jail.

terms cannot be offered to the South African native and the white colonist. Nor can we close our eyes to the possibilities of a great racial problem that may possibly be created. A special commissioner sent out by the *Daily News* wrote:—

"I watched the shambling creatures who had been brought from the slums of Canton and Hong-Kong at an enormous expense being hurried off to their daily task by the overseers. Was it for this, I asked myself, that the best and bravest blood of the whole empire had been spilt? Was it for this that the sons of all the Britains had come from the great wheatfields of Canada, from the sunny pastures of New Zealand, from the mines and the bush of Australia? Were these under-



The scarcity of labour in the Transvaal appears to be wholly an artificial condition which time was steadily mending. South of the tenth parallel of latitude, which is not too far north to draw labourers, there are quite 2,000,000 adult natives. Between 1894 and 1898 the number of Kaffirs employed in the mines rose from 40,000 to 88,000, at an average wage of 53s. 9d. per month; in 1902 only 42,000 were at work at 33s. per month. In 1903 the number rose to 64,000 at 54s. 4d. per month, and when the Chinese Ordinance was passed the native labourers had increased to 69,000.

On June 18, 1904, the first batch of 1049 Chinese arrived at Durban; by the end of November 19,440 were at work, and 32,000 more were already contracted for. At the present time the number is about 37,000, and by the end of the year there will be not far short of

100,000 CHINESE IN THE TRANSVAAL.

However we look at the matter, it is a condition that cannot be viewed with equanimity. The climate of the country is one of the finest in the world for nine months of the year, and the temperature in the mines is not excessive. Considering the profitable nature of the gold-mining industry, as evidenced by the huge dividends earned, it is regrettable that more attractive

sized and badly nourished specimens of humanity—aliens in race, in tongue, in ideas, and in standards of living—to be the people of the new dominion? Every spot where British blood had been spilt and British bravery shown, from the Cape border to Pretoria, and from Mooi River to the Bush veldt, seemed to cry out 'No.'"

America and Australia restrict Chinese Immigration.

While the Chinese are being encouraged to enter South Africa, other parts of the British Empire and the United States have found it advisable to check the inroads of the Asiatic. Between 1855 and 1867 the Chinese entered the

UNITED STATES

at a rate rising from 3000 to 7000 a year; the next dozen years the number rose to 20,000; and in 1882 over 33,000 yellow aliens entered the country. The next year a restrictory measure came into operation, and the immigrants dropped to 400, and in 1886 the number did not reach a score. In 1886 the immigration of Chinese workmen was absolutely forbidden for twenty-one years.

In 1891 there were 9129 Chinamen in

CANADA,

chiefly in British Columbia In 1900 a poll tax of $100 per head was levied on all new arrivals; in 1903 the tax was raised to $500. The immigrants, nevertheless, are largely on the increase, and in the last ten years have nearly doubled.

The increasing influx of Asiatics into

AUSTRALIA

began to cause a widespread feeling of uneasiness, and the colonies took varying steps to restrict immigration. In New South Wales masters of vessels were forbidden to bring more than one Chinaman for every 300 tons burden. Poll taxes of £10 and £100 were imposed, and still the undesirables came. One of the first measures passed by the Federal Parliament of the Commonwealth, was the Immigration Restriction Act. It excludes any person who fails to write out and sign his name to a passage of fifty words in some European language specified by an officer of Customs. Europeans of any nationality are welcomed, Asiatics are banned

Hindoo Immigrants.

A noticeable feature of the modern government of India, is the increasing importance of Hindoo coolies as labourers in different parts of the British Empire. In many regions there is a scarcity of native labour to undertake work that offers but few attractions to white men. Sugar-planting is one of the chief occupations concerned. Hindoo coolies have many good features to recommend them. The greater number of them leave their native land under direct Government supervision, which insists upon them being legally indentured to specified employers, and arrangements are made for their return home at the end of an agreed term of years. In many cases the Hindoos do not desire to return, but settle down for life in a country far removed, and with an environment wholly different to that of India. Mr. Froude's remarks concerning the Hindoos in Trinidad may be taken as fairly typical of the conditions that obtain in other regions:—

"My host took me to

A COOLIE VILLAGE,

three miles beyond the town. The scene was picturesque enough. The Indian jewellers were sitting cross-legged before their charcoal pans, making silver bracelets and earrings. Brilliant garments, crimson and blue and orange, were hanging to dry on clothes-lines. Men were going out to their work, women cooking, children playing or munching sugar-cane. In the centre of the village was a Hindoo temple, made up rudely out of boards, with a verandah running round it. The coolies are useful creatures. Without them sugar cultivation in Trinidad and Demerara would cease altogether. It is a pity that a closer intermixture between them and the negroes seems so hopeless, for it would solve many difficulties. The negro does not regard the coolie as a competitor and interloper. The coolie comes to work. The negro does not want work, and both are satisfied."

British East Africa appears to offer a large and increasing field for Hindoo exploitation. It is, in fact, the future

CANADA OF THE HINDOOS.

Already thousands are engaged in Uganda and elsewhere, not only in agriculture but in trade and commerce. Indian bazaars are becoming the recognised feature by which the African natives become introduced to the manufactured wares of civilised countries. Most of the trade of Zanzibar is controlled by Hindoos. Large numbers of British Indians leaving their homes to work in different parts of the Empire cannot but exert a wholesome influence upon a people naturally intensely reserved and conservative. They are more likely to recognise that they belong to a world-embracing empire; their views are broadened by contact with widely differing races; and they return home to leaven the vast mass of their people who know nothing of the outside world.

NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON AIR AND WATER.

BY EDWARD J. RUSSELL, D.SC. (LOND.),

Lecturer in Chemistry at the South-Eastern Agricultural College, Wye.

(*Continued from p. 460.*)

The Nature of the Gas formed during Breathing and Burning.

Experiment 61.—Place some charcoal in a piece of glass tubing about 6 inches long and half an inch diameter, connect one end with a wash-bottle containing lime water, and join this to an aspirator. It is now possible to draw air over the charcoal and through the lime water. Apply heat to the charcoal; after a time the lime water turns milky.

The identity of the gas obtained in Experiments 50 and 54 to 60 with this gas has also been established in other ways. Experiment 61 represents the simplest method of formation, the gas being a compound of charcoal and oxygen. It is called carbon dioxide or carbonic acid.

As might be expected from the preceding experiments, it occurs in the air, forming ·03 per cent. of country air and ·04 of town air.

Experiment 62.—Expose a saucerful of clear lime water; after a few days it turns milky or produces a sediment.

Lime is produced when chalk is heated, and consequently is formed in a limekiln.

Experiment 63.—Heat in the flame of a *large* Bunsen burner (an ordinary one will not generally answer) some powdered chalk in a hard glass tube. Pass the gas into lime water. The residue in the tube is lime.

Round blackboard "chalk" is not generally chalk at all, and must not be used, but the square form will mostly do.

It is now evident that the turbidity produced in the lime water was due to chalk formed by the union of lime and carbonic acid.

The gas is also obtained when animal or vegetable matter decays.

Experiment 64.—Put decaying leaves, &c., into a bottle, cork; after a few days aspirate some of the air through lime water.

It is heavier than air, and puts out a light.

Experiment 65.—Fill a large inverted bell jar with

the gas prepared by acting on chalk or marble with hydrochloric acid. Pour on to a dish of burning benzene; combustion at once ceases. This experiment is very striking and simple.

Experiment 66.—Refill the jar, tie a piece of wire round a beaker and lower it into the gas. It can be drawn out like water from a well. Plunge a lighted taper into the beaker.

Experiment 67.—If you have a bottle with an opening near the bottom, fit this with a cork through which passes a glass tube closed with indiarubber tubing and a pinchcock. Fill the bottle with carbonic acid, then open the pinchcock and allow the gas to run out into a beaker just like water would. There must be no draught, and sufficient time must be allowed. Test as before with a lighted taper.

The gas is poisonous, being fatal both to plants and animals.

Experiment 68.—Put a living plant growing in a pot into a wide-mouthed bottle, fill with carbonic acid prepared as in Experiment 65, cork tightly and leave. In a day or so the plant is dead. Usually it turns black.

This is the gas found at the bottom of wells. The children should now understand why it stays at the bottom, and also the devices adopted by those who have to go down wells to clear them out. These men test for the gas by lowering a candle and observing whether it is put out. They remove the gas by raising and lowering a bag of lime (compare Experiment 63), or by sending hot metal or burning straw to the bottom of the well, whereby a draught is created and the carbonic acid displaced by air.

We have seen that there are a variety of ways in which carbonic acid is produced. There must evidently be some method by which it is removed from the air, or in time it would accumulate to such an extent that life would be impossible. In fact we could only go on for a few hundred years at the present rate of production if there were not some counteracting influence.

It has been usually considered that this counteracting influence is furnished by plants, but we should remember that in their decay plants give out carbonic acid (see Experiment 64) precisely equal in amount to what they took up. Whether the plant is burnt or is eaten by an animal which will in turn decay, or goes through any other cycle, the end result is the same, and the removal of carbonic acid is only temporary. Moreover, large amounts of coal are burnt and quantities of limestone decomposed in the course of manufactures, and some other means of removing carbonic acid from the air must, therefore, be sought.

Recent work shows that the ocean is probably the most potent factor in keeping down the amount of carbonic acid. This gas is fairly soluble in water, and the enormous extent of the sea enables it to take up a vast amount. Taking the average amount of carbonic acid in the air at ·03 per cent., it has been calculated that the total quantity in the atmosphere is $2{\cdot}4 \times 10^{12}$ tons (*i.e.* 2,400,000,000,000 tons), whilst in the sea some 27 times this weight is present. In order that the average amount of carbonic acid should be permanently raised to ·04 per cent. (the quantity found in towns), no less than $5{\cdot}6 \times 10^{12}$ tons would be necessary to satisfy the requirements of the atmosphere and ocean. Now this would take a very long time to produce. There is evidence, however, that the amount of carbonic acid is on the increase.

Behaviour of Plants towards Carbonic Acid.

Experiment 69.—Put a *young vigorous* plant into a bottle, introduce just sufficient carbonic acid to prevent a taper burning, cork up and leave in sunlight. After a time test with a taper to see if the carbonic acid has yet disappeared. If the gas is obtained by the action of hydrochloric acid on marble, it must be washed through water to purify it. Probably the best plan is to breathe into the bottle and obtain an impure atmosphere in that way. The experiment is a difficult one, and often fails. The plant must be in a vigorous condition.

Sprigs of mint sometimes do very well for this experiment.

Dr. Priestley is commonly supposed to have first discovered the absorption of carbonic acid by plants, but that is not so. His attention was directed to the subject by Percival, who held that this gas was the "proper pabulum" of plants; but Priestley, repeating the experiments in autumn, obtained only the poisoning effects of Experiment 68.

The following sometimes works better:—

Experiment 70.—Put 20 or 30 wheat grains into a wide-mouthed stoppered bottle of about 20 oz. capacity; add a little water and leave to germinate. When the first leaves are well formed, insert the stopper and put the bottle away in a dark cupboard for two days. Remove the stopper and test the air in the bottle with a lighted taper. The carbonic acid given out by the plant (compare Experiments 57 to 60, p. 460) prevents the taper burning. Replace the stopper and put the bottle in full light, if possible somewhere where it will get the sun all day. Test the air in the bottle at the end of the day, and again at the end of the second day if the taper does not continue to burn at the first attempt. The experiment may be repeated several times with the same bottle.

Experiment 71.—Get a wide-mouthed jar, a funnel with a short shank, and a test-tube. Wrap a piece of lead round the test-tube near the mouth, put a handful of some green water-plant into the jar, fill up with spring or pond water, and put the funnel over the weed. Now fill the test-tube with water, invert in the jar, and bring the open mouth over the shank of the funnel. Stand the jar and its contents in full sunlight till the test-tube becomes more or less filled with gas. Test this gas with a glowing chip for oxygen. Then show that the water you have been using contains carbonic acid in solution. Fit a half-litre flask with a cork and delivery tube, nearly fill it with the same water as is in contact with the plants, let the delivery tube dip into some lime water, and bring the water in the flask to the boil. The lime water turns milky.

Failing water-plants, the leaves of garden mint may answer if the gas is not collected for the first hour or so.

None of these three experiments are altogether reliable, yet it is well worth while persevering, because the result is of great importance. Many variations have been devised, and the French scientists in particular have some very elegant methods, but on the whole I think the above are sufficient.

The general result is that in sunlight plants can take up carbonic acid and give out oxygen. The process is called assimilation. They cannot do this in the dark. Plants are therefore not healthy in a bedroom, though they are in a living room. But they cannot live in too

great an excess of carbonic acid, the gas is actually poisonous to them, for they will live longer in the vacuum of Experiment 46, p. 459, than in Experiment 68. In fact, plants appear to be adapted to the amount ·03 per cent. commonly present, and careful experiments show that even ·10 per cent., a quantity not unusual in schoolrooms, may profoundly modify the life history of a plant.

Should the teacher wish to emphasise these points, the following summary will be useful :—

Respiration is a destructive process, the plant substance being practically burnt; heat is given out. It involves the taking in of oxygen and the giving out of carbonic acid. It is essential to life, is seen in both plants and animals, and takes place at all times.

Assimilation is a constructive process, the plant being compelled to make the greater part of its own food, which is not supplied ready made, as in the case of animals. Light and heat are required for the process, and energy is absorbed. Carbonic acid and water are taken in, sugar and usually starch are formed and oxygen given out. It occurs only in the green parts of plants, and is a very complex process, which can scarcely be said to be understood at all, and certainly cannot be repeated in the laboratory.

NATURE STUDY.

SOME QUESTIONS AND ANSWERS.

NO topic is more under discussion among persons interested in Education than the teaching of what has come to be known as Nature Study: but we are perhaps apt to forget that we teach not so much "subjects" as human minds and souls. If this be kept steadily in view as a central principle, it will enable us to give rational and consistent answers to many questions which are frequently asked, with varying replies.

For instance, some ask whether the teaching of nature knowledge ought not to be left to enthusiasts alone, even though this should involve its becoming an optional part of the curriculum. We cannot, it is said, expect the ordinary teacher to be interested in everything, nor will he teach well anything in which he himself feels no interest.

This view sounds plausible, but, looking at it from the point of view of elementary education—I mean the education of young children, whatever their social position and the character of the schools they attend—I cannot agree with it.

In the first place, those who ask the question, with the implied negative answer, clearly see that if their idea were carried out many schools and children would get nothing of Nature Study. This to my mind—and I hope I am not forgetting the legitimate claims of other branches of instruction—would be a distinct misfortune. We have to remember our aim; we want to teach, not this or that portion of knowledge so much for its own sake alone, but this and that human child. We want to form a well-balanced and essentially human character; we desire as means to this end to build up a well-connected "circle of thought," as Herbart would put it, to open up all the main avenues of interest and of rational human pleasure, to practise and train every human power.

Now nature study — earth knowledge and living creature knowledge—seems peculiarly marked out as an essential and fundamental part of a child's education. It is the study of a very large part of his environment, constantly present in greater or less degree, and has a natural interest well worth following up and fostering. Thring, an advocate of a curriculum mainly classical, sees this clearly enough—see what he says about carnivorous stags. He and those who think with him would have this very important knowledge given, or the search for it stimulated, incidentally during literary instruction; and personally I have no objection, provided the child really gets his nature knowledge. That this was, and is, frequently not the case, every one familiar with the facts knows perfectly well. Some would put it more strongly.

When we come to the period of youth, as opposed to childhood, some amount of specialisation may be, and is, very properly permitted. Provided the primary education has been broad and sound, the secondary may well be narrower as well as deeper. This brings us to some other aspects of the answer to the question before us. To have enthusiastic specialists for every branch of instruction is quite impossible in any primary school however large, and much more so in small ones, nor is it necessary or even desirable. In large, well-equipped secondary schools it becomes more feasible, as also more necessary.

In the child schools, the topics and their treatment are all strictly elementary, and it is not unreasonable to expect those who set out to equip themselves for teaching in those schools to obtain enough all round knowledge for the purpose, and, even, though I know it sounds perhaps absurd—to some people indeed preposterous—to get up an interest in all the branches. Rather perhaps we should say they ought to be interested in education, and therefore in any and every subject, in so far at least as it is an instrument of education.

It will be said that the tendency of this is to make the teacher artificial—a pedant, or even a conceited prig. That it sometimes does do so may be sadly confessed; there are probably many besides Charles Lamb who never feel quite at their ease in the presence of a schoolmaster. It may be answered that this extreme result is not necessary; but it must be remembered that the teacher altogether, as such, is an artificial product. So too, however, are the members of all specialised trades and professions. We expect the lawyer, architect, or physician to get up at least enough knowledge of and interest in law, architecture, or medicine for reasonable efficiency. Every such calling gives a warp to the character. We look to the members of these professions to take measures to prevent the more extreme forms. Why not expect it in all cases—we do sometimes—of the schoolmaster, and provide him with full and proper opportunities for the attainment of this end?

The rule laid down must not, of course, be applied with too great rigidity. It is as impossible as it is undesirable to prevent a teacher having a greater interest in one branch than in another, and the fact is sure to come out in his teaching. Those whose business it is to oversee and criticise schools and teachers should remember this, even while remembering its proper limits. And in large primary schools some small amount of specialisation in teaching may be, and is, sometimes organised, though in such schools

experience shows that the extent to which it can be done is not great.

On the other hand, those who teach the teachers even the elements of the various branches of learning should, I think, have enthusiasm and full expert knowledge. I do not think that teachers in training should be taught as they themselves are to teach children; it is their business to shape afresh and render suitable for the instruction of children the knowledge they have gained. Nor can I approve of the plan, common in America, of making the Professor of each subject the master of method for that subject. Experts, apart from general training in teaching, are often the very worst teachers of *children;* moreover, they have commonly little knowledge of school conditions, and tend inevitably to attach undue importance to their own subject as a whole, also to some of the more scientific details.

Another question sometimes asked is, How far should the study of "Nature" be divorced from the study of "Human Nature"? To what extent should morals and analogies be drawn?

My answer to this has already been partly anticipated. Remembering our aim, and the principle from which we set out, it follows at once that there should be no divorce at all. The nature study, like every other "subject," should be part of an organic curriculum. Even on the purely intellectual side, there should be all the correlation possible. To do this as fully as some appear to advocate is not really possible and not desirable: *e.g.* to carry the idea so far as to make all the arithmetical problems proposed to the children arise out of the other work, is to become absurd and to court weariness and disgust. If a curriculum be planned with but one "core" subject, that one should be literary or humanistic; but really a double core seems better, humanistic and naturalistic, otherwise we run a risk of not getting that fuller analysis and widening of both "experience" and "intercourse" which are necessary for the building up of a "many-sided interest."

As to morals and analogies, I think they are often and may be easily overdone with little children; moreover, they should be true. The little busy bee who never plays only disgusts children, when put before them in that way. We should rather trust to the gradual formation of that reverent attitude of mind which is aided by genuine nature study.

With older and more thoughtful pupils—no longer mere children—more direct moral teaching could very well arise out of the work if continued and deepened at that age. The lessons of evolution—man's supreme place and the (biological) reasons for it; the value of brains; the proper subordination of the lower in us to the higher and distinctively human; the interdependence of all living things and the value of co-operation; the importance of strenuous individual effort, of the full development of our powers, of the preservation and improvement of the race—and many other matters could be illustrated and taught. Biology probably has a future before it in moral education.[1]

The third question with which I propose to deal is, as to whether the treatment should countenance and include the poetic interpretation and the æsthetic appreciation of Nature. The answer follows at once from the considerations previously put forward—Certainly it should! Here I have many weighty names against me, and the general tendency of science men is to take the opposite view.

But we are, or ought to be, pre-eminently educators, and educators of children, not merely instructors in this or that special branch of knowledge or skill. Our aim in nature-study teaching is not to turn out research naturalists, many present-day writers to the contrary notwithstanding, but to open the eyes of human beings to the wonder and harmony and beauty of the world in which we live, to help them by this means among others to rise above low aims and sordid pleasures.

In connection with this work, I would systematically use fine passages or phrases from Tennyson, Wordsworth, Ruskin, and a host of others—descriptive and even imaginative pieces.

I know that the scientific treatment on the one hand, and the poetic and æsthetic on the other, are often supposed to be antagonistic and mutually destructive. But need they be so, for the ordinary cultivated human being? Surely not, although there is undoubtedly some truth in the view. In shallow and ill-cultivated minds it may be so, or in great ones as a result of too long-continued and exclusive devotion to one side or the other, or in men of real genius in any case. But genius will come to its own independently of education, or in spite of it, and need not be further considered. What we want to prevent in the ordinary individual are shallowness, narrowness, one-sidedness.

There seems then no reason why these different ways of regarding nature should not be made use of concurrently. Even if we agree with Ruskin's disapproval of anatomical study, &c., for art students, we have to remember that he is speaking of and to artists, while we are considering the production of cultivated human beings "full summ'd in all their powers."

E. A. S.

[1] In this connection a pamphlet by W. Hoskyns-Abrahall on "Biology as a Factor in the Teaching of Morals" (Bristol, Dove Bros., 4d.) should be read.

SCHOOL GARDENING FOR LITTLE CHILDREN.

BY LUCY R. LATTER.

B. V.—List of Books referred to for Information and Reading.[1]

First Studies of Plant Life, G. F. Atkinson, Ph.B.; *Chapters in Modern Botany*, Professor Geddes, F.R.S.E.; *Botany, an Elementary Text for Schools*, L. H. Bailey; *Plants and their Children*, Mrs. W. S. Dana; *Structural Botany*, Asa Gray; *Seedlings*, Lord Avebury; *Flowers, their Origin, Perfumes, and Colours*, J. E. Taylor, F.G.S., F.L.S.; *Proserpina*, Ruskin; *British Flora*, Bentham and Hooker; *Encyclopædia*, Chambers; *Universal Cyclopædia*, Johnson; *An Encyclopædia of Gardening*, T. W. Sanders, F.L.S., F.R.H.S.; *Handbook on Gardening*, published by W. & R. Chambers, Edinburgh; *Schul Natur-geschichte-Botanik*, Leunis; *Illustriertes Gartenbuch*, Hüttig; *Lettres sur la Botanique* (2), J. J. Rousseau; *Die Metamorphose der Planzen*, Goethe; *The Beauties of Nature*, Lord Avebury; *Life, its Nature, Varieties, and Phenomena*, L. H. Grindon; *A Vision of Sir Launfal*, Lowell; *Al Fresco*, Lowell; *A Summer*

[1] Most of the books referred to are to be found in the Library of the British Museum.

Ramble, Bryant; *Thank God for Summer*, Eliza Cook; *Lady June*, Eliza Cook; *September*, Wordsworth; *The Fruit Gift*, Whittier.

List of Books from which the Games, Stories, and Recitations have been selected.

Songs for Little Children (Vols. I. and II.), E. Smith; *Songs, Games, and Rhymes for the Nursery, Kindergarten, and Primary School*, E. L. Hailmann; *Kindergarten Chimes*, K. D. Wiggin; *Song Stories for the Kindergarten*, M. J. Hill; *Songs and Games for Little Ones*, Walker and Jenks; *Fifty Children's Songs*, Carl Reinecke; *Little Songs for Little Voices* (Book I.), Alfred Scott Gatty; *Songs and Music of Froebel's Mother Play*, S. E. Blow's edition; *Holiday Songs, and Every Day Songs and Games*, Emilie Poulsson; *Finger Plays for Nursery and Kindergarten*, Emilie Poulsson; *The Child's Song and Game Book* (Part I.), H. Keatley Moore, Mus. Bac., B.A.; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown; *Stories Mother Nature told*, J. Andrews; *In the Child's World*, Emilie Poulsson; *Philadelphia Kindergarten Stories*, L. van Kirk and M. G. Clark; *Mother Stories*, Maud Lindsay; *Child Garden* (Vols. III., VIII., and IX.); *A Child's Garden of Verses*, R. L. Stevenson; *Little Folk's Land*, H. G. Groser; *Flowers I Bring and Songs I Sing*, Edith Nesbit; *Poetical Works*, M. Howitt; *Rhymes and Finger Plays*, selected or written by Lucy R. Latter for the "Every Day Life Series of Pictures," published by W. & A. K. Johnston.

(*To be continued.*)

THE ELIZABETHAN POOR LAWS.

BY HENRY SMART, M.A., HUGH MYDDELTON SCHOOL.

IN the latter half of the fourteenth century, and again in the sixteenth century, there were periods of great activity in legislation concerning the poor. In each case the result reached, in 1388 and in 1601 respectively, sufficed for a great number of years.

But there were several differences between the legislation of the two periods. In the fourteenth century legislation took it for granted that there was work for all, and that therefore there was no excuse for idleness. In fact, it almost seems as if the vagrancy of that time was a sign of prosperity rather than of the reverse; men were wandering from place to place in search of the highest wages. Accordingly there is no reference to any class of men who were willing to work but could not obtain employment. Another important difference appears in the nature of the remedies applied. These were almost wholly negative: men were not to wander, people were not to give to vagrants. In 1388 the existence of the impotent poor was recognised, but there was no actual plan of aiding them. Thus, as yet, it was not a public duty, but a private virtue, to help the impotent.

In each case legislation was directed towards the removal of existing evils. In the fourteenth century these had arisen suddenly, and were due almost wholly to one cause—the Black Death. But in the sixteenth century there was not only vagrancy but poverty, and these had arisen slowly, owing to several causes.

The first, and by far the most important, of these was the increase in the production of wool, necessitating "enclosures." This term must not be misunderstood. It applies to the changing of arable land into pasture, as well as to the forcible seizing of a piece of common land, for when the open-field system of farming was carried on, enclosing was necessary before sheep could be reared; consequently enclosing was done not only by lords of manors, but also by tenants. It is evident that a man's right to enclose would vary according to the land enclosed. The practice caused suffering in various ways: when a lord turned his arable land into pasture some men lost their occupation altogether, while others lost the extra money they had been able to earn at such seasons as harvest; and when a piece of common land was seized the poor people lost grazing for their few cattle; while sometimes tenants were dispossessed in order to allow of enclosures. But apart from the suffering actually caused in these and other ways, there were the hardships inseparable from great economic changes. The practice of enclosing began after the Black Death, but till the end of the fifteenth century went on but slowly. Under Henry VII. and Henry VIII. it went on much more quickly. This was partly due to the difference in the class of men who were the landowners of the country after the Wars of the Roses, and again after the dissolution of the monasteries. An inquiry into the subject was ordered by Henry VIII. in 1517, and various remedies were tried, such as limiting the number of sheep which any one man might keep. A commission was appointed by Somerset; but the Protector fell in 1549, and the Parliament which met after his fall, under the influence of Warwick and others, declared enclosures to be legal. Under Elizabeth parliamentary action was again taken, and by the end of the century the trouble seems to have ceased, though in 1607 there was a rising against enclosures under "Captain Pouch" in Northamptonshire. Many areas remained enclosed, but the country had begun to settle down to its new conditions, the woollen manufacture helping to find employment for those out of work through enclosing. But parliamentary action, such as the Act of 1598 "for the maintenance of husbandry and tillage," had partly stayed the growth of grass at the expense of corn; while the cultivation of corn itself had been encouraged by good crops and "toleration of vent," *i.e.* of export. The temporary return of the trouble towards the end of the sixteenth century was due to the high price of wool.

An unfortunate effect also followed from wise legislation on the part of Henry VII. With the help of the Star Chamber he suppressed maintenance. This was undoubtedly wise, but it had two ill results. The first was, that it lowered the military efficiency of the country. The retainers of the great nobles were disorderly, but they could at least fight; and consequently when the practice of giving liveries was stopped, the country made but a poor show in war, as was painfully evident in the early years of the reign of Henry VIII. This does not concern us here, but the suppression of maintenance also increased the number of "sturdy beggars." We see the good result of Henry's action in the fact that the last great fight between the supporters of two rival nobles took place under Edward IV.; but we see the evil side in the legislation of the Tudors against the valiant beggars, whose existence was partly due to that legislation. That Henry's action was not regarded as an unmixed blessing appears from Bacon's words, "Out of all question, the splendour and magnificence and great retinues and hospitality of noblemen and

gentlemen, received into custom, doth much conduce unto martial greatness. Whereas, contrariwise, the close and reserved living of noblemen and gentlemen causeth a penury of military forces."

The dissolution of the monasteries by Henry VIII. also had most important results, though not in the way that has often been suggested. It has been said that they did a great deal towards the relief of the poor, and that the Tudor Poor Laws were the result of their dissolution. Hallam calls this idea "a very ungrounded prejudice," and controverts it by a species of *a priori* reasoning. He points out that (*a*) the monasteries were often in secluded places, (*b*) they were at irregular intervals, and (*c*) there was no joint action between them; and therefore concludes that they could not have done much to help the poor. The same result may be reached in other ways—(*a*) similar legislation was necessary in countries where the monasteries were not abolished, and (*b*) poor law legislation began under the Tudors before the effects of their dissolution could have been felt; the most important Act on the matter under Henry VIII. was passed in 1536, and the dissolution of the monasteries took place in 1524, 1536, and 1539. Doubtless much was given away by the monasteries in charity; but this was given to vagrants, and such giving, as we know by this time, increases vagrancy. One of the complaints against the monasteries was that sturdy beggars were in the habit of resorting to them for alms.

But although the monasteries thus evidently did little to relieve the deserving poor, they did a good deal to prevent poverty. The monks were always indulgent landlords, and in hard times tenants would be assisted by them. In addition to this we have, as in the case of enclosures, a great shock to society, caused here by a large amount of property changing hands. In these two respects the dissolution of the monasteries did lead to a great amount of poverty.

These were the great causes of poverty under the Tudors. Compared with them the others, important though they were in themselves, were relatively insignificant. For instance, the bad harvests and consequent high prices of wheat and other grain between 1527 and 1536 occasioned suffering to the poor, and hastened on enclosures. The debasement of the coinage, carried to such an extent under Henry VIII., was also responsible for poverty.

The great increase in the manufacture and export of woollen cloth affected the problem in two ways. It helped to counterbalance the lack of employment caused by enclosures, but it also made possible temporary troubles caused by international or economic complications. This manufacture had been growing during the fifteenth century, during the whole of which period we were struggling for supremacy with our industrial rivals, the manufacturing towns of the Netherlands. The "Intercursus Magnus" of 1496 gave the victory to England, and consequently under Henry VIII. there was a great increase in the export of cloth. Towards the end of his reign there began an immigration of foreign manufacturers, caused by religious persecution. The numbers of the immigrants were much increased under Elizabeth, and led to a great improvement in the woollen manufacture. When the trouble inseparable from economic change had ceased, this must largely have settled the difficulties caused by enclosures, for Suffolk, Essex, and Kent were among the counties where enclosing went on most; while Norwich, London, Sandwich, Canterbury, and Colchester were among the towns where the foreigners settled.

To alleviate this distress there were various agencies. It had always been looked upon as a duty of the Church to look after the poor, and in ancient times we read of a three-fold division of Church revenues—between the clergy, the Church buildings, and the poor; and of a four-fold division—between the bishop, the clergy, the Church buildings, and the poor. This division had fallen into disuse, but the strength of the idea remained, and is seen in the important part played by the Church in the execution of the Poor Laws. Concerning the part played by the monasteries enough has been said already. There were two reasons for regarding the oversight in this matter as a duty for the Church: first, because of the great amount of land held by the Church; and second, because the giving of alms was a virtue, and had not yet become a civic duty.

Then there were the hospitals, founded largely in the fourteenth century, and the alms-houses, which sprang up during the fifteenth. Hospitals were not only for the sick: some were chiefly for them, others were chiefly for the destitute, while yet others were for both. They varied much in size, but at the time of the Reformation there were some hundreds of them in the country. The alms-houses were founded by the guilds and by private persons. Neither hospitals nor alms-houses were all suppressed, and during the reign of Elizabeth many alms-houses were founded.

There was also private charity. Of this there was a great deal, but, unfortunately, since the motive was the welfare of the donor, it was quite indiscriminate, which is equivalent to saying that it did more harm than good. Many of the nobles, lay and spiritual, fed daily twenty, sixty, or even two hundred people; on feast-days they were even more generous; and on the occasion of their burial most generous of all. We give one example. At the funeral of a certain Earl of Shrewsbury, which took place at Sheffield, those that distributed the dole said that eight thousand people were served, and that there were as many more present that could not be served "through their unruliness." Many were hurt and some even killed in the crush. These "doles" took various forms, a penny each, twopence each, bread and meat, and so forth.

Thus we see that two of the agencies at work did quite as much to promote vagrancy as to relieve poverty. The guilds did something towards relieving their destitute members, sometimes by a loan, sometimes by a gift from their funds, and sometimes by a collection. But this did not much affect the problem.

Before passing on to consider the attempts made under Elizabeth to grapple with the question, we briefly notice the action taken under the earlier Tudors. In 1530 it was ordered that only those should beg who were licensed by the Justices, while the able-bodied were to be whipped. In 1536 collections were ordered to be made on Sundays and festivals for the impotent, the clergy exhorting the people to give; "common doles" were forbidden, but, owing to exceptions made, did not entirely cease; wealthy parishes were directed to help the poorer; while vagabonds were to go home, and might receive help so long as they covered ten miles a day. Eleven years later, in 1547, Parliament ordered that homes should be provided for the impotent, and that vagrants should be branded, but this latter clause was soon withdrawn. In 1555 begging licences were again allowed, and it was directed that where the

clergy could not persuade people to give, the bishop should send for them and try his powers.

Under Elizabeth we first notice "An Act for the Relief of the Poor," passed in 1563. The purpose is stated in the preamble, "that idle and loitering persons and valiant beggars may be avoided, and the impotent, feeble, and lame, which are the poor in very deed, should be hereafter relieved and well provided for." The former is secured by re-enacting previous statutes, and this Act concerns itself with the impotent poor. Registers of these are to be prepared. Borough officials, or, in country parishes, the vicar and church-wardens, are to call the people together and appoint collectors. These are to obtain from the inhabitants promises of weekly contributions for the poor. But in connection with these weekly offerings compulsion appears. If any be unwilling to give, the parson is to "gently exhort" him; then the bishop is to send for him; and if he still "obstinately refuse," he is to go before the justices of the peace. These are to "charitably and gently move him," but if he "will not be persuaded," the justices may assess him, while if he still refuse to pay they may put him in prison. Begging is not altogether prohibited. If a parish has more poor than it can keep, the justices may grant licences to beg in the neighbouring parishes within a certified area. A somewhat similar idea is seen in the provision that parishes with no poor in them are to help those where poverty abounds.

In 1572 was passed an important "Act for the punishment of vagabonds, and for the relief of the poor and impotent." A terrible picture is drawn in the preamble. The country is "exceedingly pestered with rogues, vagabonds, and sturdy beggars," and the result is "horrible murders, thefts, and other great outrages." A fresh start is made by annulling the Acts of 1530, 1550, and 1563.

A vagabond is to be "grievously whipped and burnt through the gristle of the right ear," unless some one is willing to take him into service for a year. The second offence is to be accounted felony. So that there should be no mistake, a long list is given of those who are deemed vagabonds, amongst whom we read "those feigning themselves to have knowledge in physiognomy, palmistry, or other abused sciences; fencers, bearwards, common players in interludes and minstrels, not belonging to any baron of this realm or any other honourable personage; jugglers, pedlars, tinkers, and petty chapmen; scholars of the universities of Oxford or Cambridge that go about begging, not being authorised under the seal of the said universities; shipmen pretending losses by sea." There were evidently many vagabonds about, for the Act says that the common gaols "are like to be greatly pestered with a more number of prisoners than heretofore hath been."

As regards the impotent, lists are to be prepared as before by "diligent search and inquiry." The justices and town officers are to appoint places and prepare buildings for them. Money is to be raised for this purpose by assessing the inhabitants, and collectors are to be appointed. But it is important to notice that this is only "if the parish within the which they shall be found shall not or will not provide for them." Any impotent poor out of their native parishes are to be conveyed there, and persons refusing to act as overseers are to be fined ten shillings.

Two other provisions are worth noticing. After providing for the impotent, any surplus is to go towards finding employment for those willing to work; and the children of beggars may be bound out to service.

"An Act for the setting of the poor on work, and for the avoiding of idleness," passed in 1576, says nothing about the impotent poor, and little about the sturdy beggars. It is passed "for some better explanation and for some needful addition" to the Act of 1572, and concerns itself chiefly with able-bodied persons willing to work. The mayor and other officers are to raise a store of wool, flax, hemp, iron, and other materials for their use. This may be given to the poor to use at home. Houses of correction are to be built in every county, where those able but unwilling are to be made to work. The justices are to appoint overseers for these places, and any refusing to act are to be fined five pounds.

The year 1598 was highly important. First we have "An Act for the relief of the poor." The justices are to appoint overseers, in which capacity the church-wardens are to act. These, by taxation, are to provide for the impotent and to raise a store of materials as before, to find work for the able-bodied. If any will not contribute, their share may be taken by distress. If a parish has more poor than it can keep, the justices may assess other parishes in the same hundred, or, if necessary, in the same county. The overseers are to meet in the church once a month. Places of habitation are to be erected for the impotent, by authority of the overseers and with the consent of the lord of the manor, on any waste or common land. Those who are able to work but unwilling are to go to prison. Begging is prohibited, except in the case of those who, with the permission of the overseers, ask for food in their native parish, and of discharged sailors or soldiers going home. The voluntary idea still remains in the regulation that contributions may be fixed "by the agreement of the parishioners within themselves."

Next came "An Act for punishment of rogues, vagabonds, and sturdy beggars." The justices are ordered to erect houses of correction for the reception of these, and a long list of those accounted vagabonds is again issued, similar to that of 1572. Any taken begging are to be stripped naked to the waist and severely whipped, and then sent to their native parish. If any of the rogues appear to be dangerous, or will not be reformed, they may be "banished out of this realm" to some place decided upon by the Privy Council. Shipwrecked sailors may still beg on their way home.

In this year was also passed an Act granting permission to owners of land to erect "hospitals, *maisons de dieu*, abiding-places, or houses of correction." The only stipulation was that they must have an endowment of the annual value of at least ten pounds.

The great Act of 1601 was practically a re-enactment of that of 1598. There were a few differences, the chief of which was the disappearance of permission to beg even in the case of those who asked victuals and of sailors and soldiers going home.

The importance of these statutes consists in the principles embodied in them and in the continuity of these principles.

We have recently had the opportunity of seeing the five 15-carat Gold Medals awarded by the Principals of the Normal Correspondence College to their top students. No less than five passed in Division I. of the First Class at the recent King's Scholarship Examination. The fortunate winners not only have this handsome memento of their success, but also share the £100 prize given by this popular and successful Correspondence College.

The Practical Infant-School Teacher.

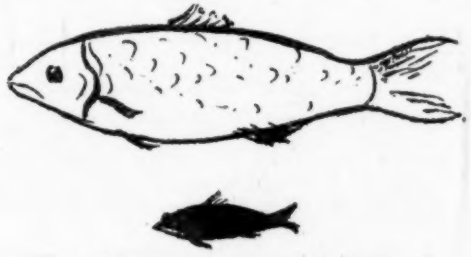
SUGGESTIONS FOR CARRYING OUT THE OCCUPATIONS IN CONNECTION WITH THE CORRELATED SCHEME OF WORK FOR AN INFANTS' SCHOOL.

May, Week I.

Clay Modelling.—You are advised to make a *solid* model of this, as it will be much more successful than an

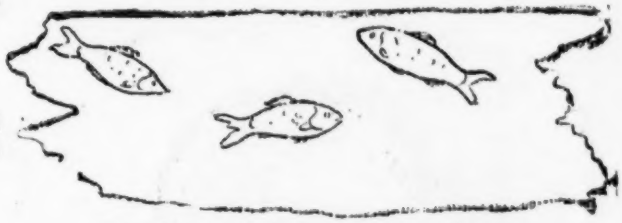
WEEK I.—CLAY MODELLING: FISH BOWL.

attempt to make a hollow one. Proceed as follows:—Make the sphere first, then draw a circle with a pointed stick or slate-pencil anywhere on the sphere, the exact position does not matter, provided the sphere is a true one. This circle will be the top of the bowl.



WEEK I.—BRUSHWORK: A FISH.

Now with the thumb and finger work up the clay round this circle to form the neck of the bowl. It should be pinched up sufficiently high to allow of its being rolled over at the top as shown in the illustration. While you are working it up, depress the centre slightly with the thumb, and be careful that the amount of clay worked up is even all round. Slightly flatten the bottom, so that the object will stand. You



WEEK I.—CRAYON WORK: FISHES IN WATER.

will, of course, model from the real object, and explain to the children why they are not making a hollow bowl.

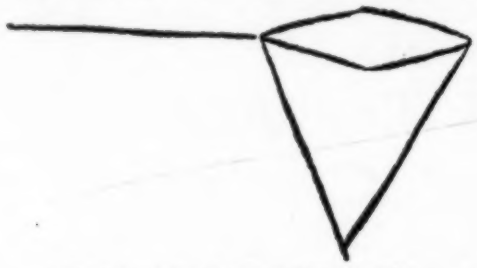
WEEK I.—PAPER CUTTING: A FISH.

Brush Painting.—This exercise may be carried out in either of two ways. You may represent the fish by

WEEK I.—BLACKBOARD DRAWING: STICKLEBACK'S NEST.

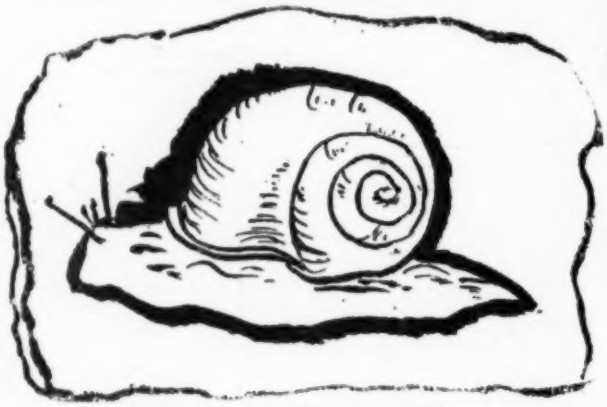
means of the outline with the brush point, or you may use a wash and simply give the form in mass. The

outline with the brush point is perhaps préferable, as you are able to show points of structure such as fins, scales, and so forth, so much better. It is possible, too,



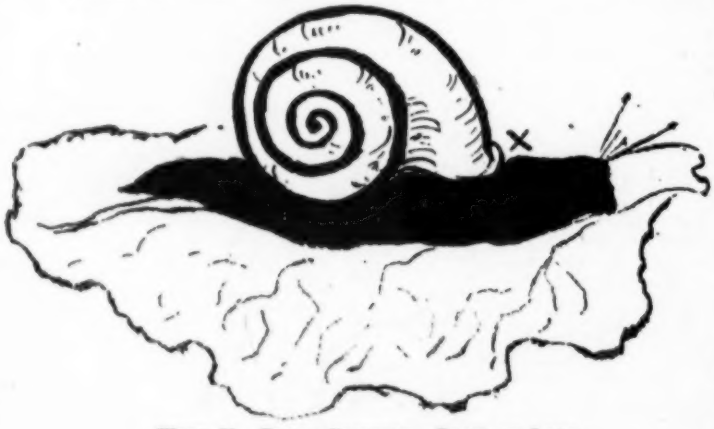
WEEK I.—STICK LAYING: MINNOW NET.

to represent the shape of the fish by a simple blob, adding a touch or two for the fins and tail.



WEEK II.—CLAY MODELLING: SNAIL.

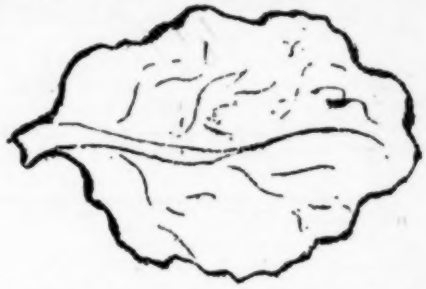
Crayon Work.—This is an exercise which gives great pleasure to little children. Reproduce by means of a



WEEK II.—BRUSH PAINTING: SNAIL ON LEAF.

WEEK II.—CRAYON WORK: SAME AS BRUSH PAINTING.

copier. Use blue and brown crayons. If the children have had fair practice in filling in, let them *lightly* cover the groundwork in blue. Next proceed to depict the fishes; brown will be the nearest colour you can get in the crayons. Caution the children against pressing too heavily. If the children are new to this kind of

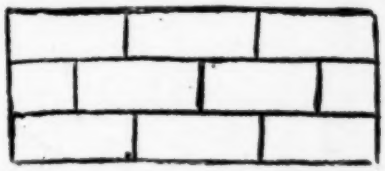


WEEK II.—PAPER CUTTING: CABBAGE LEAF.

work, the water is best represented by a few lines which the teacher should show on the blackboard. It is here assumed that a lesson on the stickleback may be useful to your children, but the idea is suitable to a lesson on any fish, and you will adapt to suit your own needs.

WEEK II.—BLACKBOARD DRAWING: SNAIL ON CABBAGE.

Paper Cutting.—There is no great difficulty in executing this when the form of the fish has been drawn. Care is required in cutting curved lines so that they are not jagged. This may also be cut from a square of paper folded in half, but in this case the fins will, of course, be opposite one another. The fold of the paper

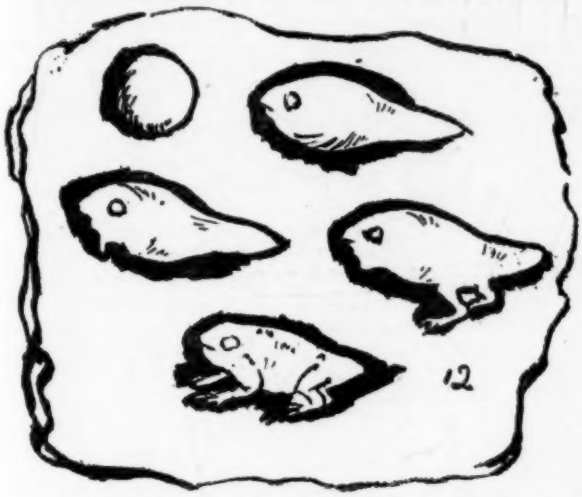


WEEK II.—STICK LAYING: GARDEN WALL.

will come along a line through the middle of the fish. Begin to cut at the head and along the upper line towards the fin on the back, and thence to the tail.

Blackboard Drawing.—This is a very interesting study, and it will help to make the life history of the stickleback more real to the children than anything else. Have it drawn a good size, and use coloured chalk if possible, yellow and brown, for the twigs composing the nest. The fish itself would be best in white, with a touch of red underneath to dis-

tinguish the male fish. For information concerning the stickleback you are referred to *By Pond and River*, "*Eyes and No Eyes*" series, by Arabella Buckley.



WEEK III.—CLAY MODELLING: LIFE HISTORY.

Stick Laying.—Two lengths of sticks are required here. Let the children sort them. Draw a picture of this first, and refer to the story about the stickleback. Lay the diamond shape for the opening of the net first and the handle, then the two long sticks for the pointed end of the net may be placed both at the same time. The children should first *hold* them in the position in which they are afterwards to be placed on the desk.

May, Week II.

Clay Modelling. — A common method of modelling the snail—that of rolling a long thin piece of clay, and then twisting it into a spiral to represent the shell,

WEEK III.—BRUSH PAINTING: TADPOLES IN POND.

and adding the body of the snail underneath—is well known. This method cannot be recommended as an exercise in modelling *form*, for it does not really represent the object which it is intended it should. Have some snail shells at hand and distribute them to the class; they should be well examined, and the children asked what form they are most like? Let them all roll a small piece of clay into a ball, then ask what shall be done to this to make it like the snail's shell? The children will probably discover what is required. A very little manipulation with the hands will produce the form of the shell; then mark upon it with a pointed

WEEK III.—CRAYON WORK: FROG.

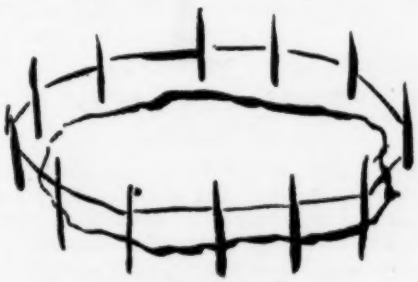
slate-pencil the spiral line as shown in the illustration. For the body of the snail roll a piece of clay between the hands as like the natural shape of the snail as possible, and place this in position beneath the shell. The horns—two long and two short ones—must be

WEEK III.—PAPER CUTTING: FROG.

WEEK III.—BLACKBOARD DRAWING: STAGES OF DEVELOPMENT, SAME AS CLAY MODELLING.

carefully added thus: Roll small pieces of clay very thin, and insert into the clay by making small holes with a pin.

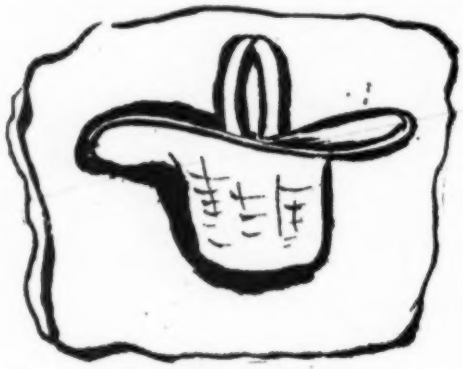
Brush Painting.—This ought to be a most educative exercise. Sap green and brown are the colours



WEEK III.—STICK LAYING: RAILINGS ROUND POND.

required. Paint the snail first in this way: Fill the brush with brown paint, and with the point make a spiral beginning at the centre and ending at X on the body of the snail. Add some fine lines on the shell to

give the idea of the markings. Now paint the body of the snail, beginning at the pointed end. It should be done in two strokes. Add the horns by making fine lines. Then again with the point, and using green paint, indicate the cabbage leaf as shown in the illustration. Do not omit the fine lines on the leaf to represent the veins.



WEEK IV.—CLAY MODELLING: FLOWER BASKET.

Crayon Work.—The illustration just described is very suitable for this occupation, but in this case it would of course be reproduced by means of the copier, and the cabbage leaf would be filled in with green crayon instead of being simply outlined.

Paper Cutting.—Let the children draw this and then cut it out. With lead-pencil indicate the veins on the surface of the leaf.

WEEK IV.—BRUSH PAINTING: ROSE LEAF.

Blackboard Drawing.—This—or the single cabbage leaf—is a good exercise. Use green chalk if possible. It will increase the interest of the children to draw a small edition of the snail on one of the leaves.

Stick Laying.—This is exceedingly simple, but it may be made the means of much conversation. Three sizes of sticks are required. Let the children sort them into their respective lengths. When the stick picture has been laid, go round and reward the diligent ones by drawing a small snail on the desk by the representation of the wall.

May, Week III.

Clay Modelling.—There is no difficulty about an exercise of this sort, but it is a useful one if viewed in the light that it is only knowledge *executed* that is a full and sure possession. Froebel's words, "What the child *does* he begins to understand," has a deeper significance than appears at first sight. See, also, the motto to the game of "The Weathercock," No. 3 in the *Mutter und Kose Lieder*, where this idea is expressed in verse. To model the fully developed frog, obtain the sphere and then flatten it, making it rather wider at one end for the head. With a slate-pencil

WEEK IV.—CRAYON WORK: DOG ROSE.

WEEK IV.—PAPER CUTTING: ROSE LEAF.

make a groove or slit round the front for the mouth. Put the eyes on—little round lumps of clay, one at each side. Make some marks on the back, and finish by putting on the legs made from pieces of clay rolled out. When attaching them fold them first forward then backward (see illustration for crayon work). This is best made on a slab, and as the frog itself takes some little time to model, it would be best to allow a full lesson for this after having previously taken the other stages of the life history.

Brush Painting.—This is best carried out in the natural colours—pale blue for the water, green for the reeds, and brown for the tadpoles. Should the three colours be quite impossible, use green and brown. Paint the reeds first by making simple brush strokes beginning from below, then the tadpoles brown, and add a few touches of *pale* brown for the water. Here, again, the value of such an exercise lies in the fact that knowledge becomes assimilated through action.

WEEK IV.—BLACKBOARD DRAWING: DOG ROSE.

Crayon Work.—The most effective colours will be brown for the stone, and green with brown marks on the back for the frog. Be careful in filling this in to leave the eyes and mouth untouched. You cannot do without a good drawing on the blackboard to demonstrate from.

Paper Cutting.—This is a good opportunity for getting practice in drawing the frog. Let the children make several attempts and cut out the best.

Blackboard Drawing.—The stages of the frog's life history will form a good subject for this lesson. Have them drawn as large as possible.

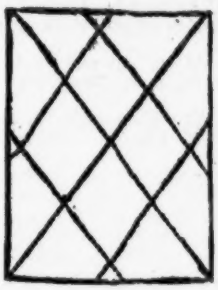
Stick Laying.—Take from six to eight sticks of equal length, and by demonstration let the children place them as shown in the illustration. The teacher may then, with chalk, add on the desk the cross lines needed to form the outline to the pond. Indicate what you are going to do on the blackboard to begin with.

May, Week IV.

Clay Modelling.—This makes an exceedingly pretty model, not difficult to execute, but difficult to describe in words. Obtain the sphere, then by gentle pressure into the centre, and gradual working up by means of the fingers with both hands all round, obtain the shape of the bowl of the basket. Elongate somewhat at the two sides, and bend slightly downwards. Roll two pieces of clay to form the handle, twist them, and finish by some marks on the outside to represent the plaited straws of the basket.

Brush Painting.—This is a delicate piece of work. Use sap green. Paint the fine stem as far as the stipule, then the leaves each in two strokes, leaving a white line to show the mid vein. Carefully draw attention to the leaf-like stipule at the base of the leaf, and then let the children paint it. The children who have once, in such a way as this, made knowledge the basis for action, are not likely to forget the existence of these stipules.

Crayon Work.—The colours required for this are pink and green, with just a touch of yellow for the centres of the flowers. A good drawing on the blackboard, considerably enlarged, is essential. Reproduce by means



WEEK IV.—STICK LAYING: WINDOW OF SUMMER HOUSE.

of a copier. The stem is the best part to attempt first, then the leaves, and lastly the flowers. It will require some care, but has frequently been very well executed by five-year-old children.

Paper Cutting.—You are advised to have this drawn first and then cut out. Draw attention to the composition of the compound leaf, and compare with other simple ones. The slight notching at the edge is not difficult to carry out, but draw the children's attention to it before beginning.

Blackboard Drawing.—Have this drawn as large as your blackboard will permit. Notice again, specially, the leafy stipules, and the way in which the calyx covers the buds.

Stick Laying.—Two sizes of sticks will be sufficient for this. You can make the picture entirely with sticks, or, if you prefer, let the outline be laid out, and then with your chalk on the desk or table make the cross lines.

The Practical Teacher's Art Monthly.

MAY NUMBER.

Chief Contents:

SOME NOTABLE FRENCH ETCHINGS.
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METAL WORK FOR SCHOOLS.
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FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than May 8, 1905**, and addressed:—PRIZE EDITOR, Office of the *Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Tout le monde peint bien, dit l'un, tout le monde fait bien les vers, répond l'autre. Oui, si par bien peindre et être bon poète, on peut entendre ne manquer ostensiblement à aucune règle convenue, s'exprimer couramment dans le langage de tout le monde et savoir relier habilement par des procédés connus des phrases apprises et des poncifs. *Tout le monde peint bien* parce que tout le monde a été à l'école, a visité les musées et a la tête meublée de souvenirs. Or la mémoire est une faculté calme qui ne fait pas trembler la main comme l'imagination. Nos artistes mettent sur leur palette du Rubens, du Rembrandt, du Cuyp, &c., &c. Ils s'entourent de gravures. Comment, avec cela, en y ajoutant un peu de goût et les traditions de l'école, ne réussiraient-ils pas auprès de la foule? Mais regardez d'un peu près les œuvres de ces habiles peintres, appliquez-leur la méthode de jugement qui résulte de l'étude des maîtres, et vous découvrirez qu'ils n'ont ni unité, ni science, ni sincérité, ni idéal, ni bonne foi, ni art de composition, rien, en un mot, de ce qui constitue, non pas le grand peintre, mais le peintre. *Tout le monde écrit bien* parce que tout le monde sait lire, et que, depuis trois cents ans que l'on imprime, bon nombre de sentiments et de nuances de sentiments ont été exprimés par de grands écrivains. N'est ce pas le sublime du genre scolastique et académique que d'emprunter la pompe à Bossuet, la concision à La Bruyère, la profondeur à Pascal, l'ironie à Voltaire, la passion à Rousseau, &c., &c.? De sorte qu'à force d'exprimer ses propres sentiments avec le langage des maîtres on arrive à penser à leurs frais, et finalement à ne plus penser du tout.

CHARLES ASSELINEAU.

RESULT OF THE APRIL COMPETITION.

The prize is awarded to "Tencico." Will "Tencico" kindly forward name and address for publication?

First Class.—Fitzthomas, Lemuel Gulliver, St. Regulus, Daisy M., Eicarg, Fezz, Gawayn, Snowdrop, Caen, Chaos, Nomad, Beth May, Nella, Kit, Agaznog, Michel, Dijon, St. Fittick, Odd number, Good Hope, Barberton, Mannie, Lex, Stratmore, Tyro, C.E.M., Hiawatha, Sweetbrier, Foyle, La Printanière, Yorick, Stars and Stripes, Mikado, Mr. Micawber, Comet, Paysan, Hillfield, Theodore Vincent, Woolley, Determined, Marguerite, Zita, Bonne Aventure, Alpha, Macduff, Pas souvent, Les gens à pied, Mair, Peel Castle, Trilby D., Robin, Ghamakas, Violette, Catholicus, Anthée, Hebe, Ten, Nil desperandum, Dos, Jabberwock, Ernest, Nick, Aim, Isoline, Rosamund (R.T.), Plumæ, Alicia, R. M. K., Adlitam, Aitia, Grimbarian, Baldur, Genêt d'Or, Nicotine, Buttercup, Dollakin, Styx, Garnet, Motor, Moon, Nehemiah, Ruby, L.S.B., La Débutante, Edythe, Bon Accord, Guillaume, Cymraes, Deloraine, E.S.L.A., Richmond, Ernestine, Lucie, Espérance (A.), L'Avare, W.S.Q., Bea, Excelsior, Clio, Les Haies, Dunkeld, S.A.G.

Second Class.—L'Été, Yo-san, Marguerita, Osuma, Summerbank, Inquiet W., Pâquerette, Trente-et-un, Beauty, Eleanore, Phlox, Trans Montem, Dunhevedian, Sexean, April, Cinq-Mars, G.P.R., Gabrielle, Vassy, Espérance (B.), Jo, A.C.P., Jean d'Arc, G.W., Hockley, Red Rose, A.B.C., Rosa, Polly, Njenlsla, H.A.S., Trota, Aimée, Careless, Au Plaisir, Fido, U.F.N., Baby, Evangeline, Siskin, Furzillian, Jean Valjean, Pike Laner.

Received too late.—Danella, Bees, Le Chevalier d'Artagnan, Bracebridge, Tadpole.

The name and address of "Robin," who won the March prize, are: Miss E. Birtwell, Broadgate, Fulwood, Preston.

Report.

The steady improvement in quality which is gradually going on is very marked this month. Mistakes occur most frequently in the translation of words spelt like English words, as *pénétration*, but not having the same meaning. *Pénétration* means "blending" or "intermixing," whilst *respectable* has not the conventional and colourless meaning of the English word of the same spelling. A good many competitors either did not notice the bold metaphor in *A prolonger dans l'avenir*, etc., or were afraid to translate it literally. The literal rendering is quite the best in this case. It was somewhat remarkable to notice how many translated *les conditions mêmes* as "the *same* conditions," quite oblivious of the fact that this rendering was utterly inconsistent with the author's argument.

Prize Translation.

"Wars there will be doubtless again. Brute instincts, combined with natural covetousness, arrogance, and hunger, which have disturbed the world for so many centuries, will disturb it again. The immense masses of humanity, while tending to consolidate, have not yet fixed their spheres and attained stability. Intercourse between nations is not at present methodical enough to secure the common good by promoting freedom and ease in the exchange of products, man has not yet come to be regarded by man universally as worthy of respect; the several sections comprising humanity are not as yet nearing an alliance together in concord to form, as it were, the cells and organs of one and the same body. It will not be permitted even to the youngest of us to see the close of the age of arms. Yet these better times which we may not know we feel must come. By tracing forward into the future the curve of progress begun we can discern the establishment of more frequent and more perfect communication between all races and peoples, a livelier and more general sense of mankind's unity of interests, the systematic organisation of labour and the foundation of the United States of the World. Universal peace will some day be realised, not because the nature of men will improve (that is not to be hoped for), but because a new order of things, new knowledge, and new economic needs, will impose upon them the state of peace, just as previously the very conditions of their existence placed and kept them in the state of war.

"TENCICO"

ON THE STUDY OF GERMAN.

IX.

NO series of papers on the study of German would be complete without some hints on the graduation of a course of reading in German literature. There is a tendency amongst English students to postpone their reading in a foreign tongue till they have mastered, or think they have thoroughly mastered, its grammar. The details of the accidence had better, on the whole, be well mastered before the student begins to read, but we should not admit that a student who has acquired a parrot-like proficiency in repeating rules of syntax, but who had only read little, had really mastered the syntax of the language. Master it he cannot until he has to support him an experience in reading the written language which will make these rules living realities and permanent acquisitions. The student who constantly reads is just as constantly revising and making a sure possession of his grammatical knowledge.

At first the student will need to have the dictionary regularly by his side in reading, and he should note down the meanings of the new words he encounters. It is not advisable to have too abbreviated a dictionary. Discouragement and disappointment will only follow repeated failure to discover words strange to us in the dictionary we use. As the student gains experience, he will find himself able to infer from the context the meanings of many of the new forms he comes across, and to determine for himself the signification of a word from its derivation.

It would not be advisable for the student to fly too high in commencing his reading of German, although many of the prose works of Goethe and Schiller, for example, present, on the whole, very little difficulty. Schiller's *Geschichte der dreissigjährigen Kriegs*, and his *Abfall der Nederlanden* are written in an exceedingly interesting style, and Goethe's *Wahrheit und Dichtung aus meinem Leben*, *Italienische Reise* and *Campagne in Frankreich* are not too difficult for the elementary student. But, on the whole, the student would be better advised to begin with such things as the *Märchen* of the brothers Grimm, the *Karavane* of Hauff, the shorter tales of Paul Heyse or Ernst von Wildenbruch, or the plays of Gustav Freytag, or Kotzebue. *Die Journalisten* of Freytag and *Die deutschen Kleinstädter* of Kotzebue are respectively their dramatic masterpieces. The student whose tastes lie in the direction of novel-reading will not perhaps find in German such a varied choice of excellent romances as in English or French. Freytag and Frenssen may be particularly recommended as authors of masterpieces which are truly German in sentiment and elaboration. Freytag's *Soll und Haben* is his finest novel, whilst *Jörn Uhl* and *Die drei Getreuen* of Frenssen are novels impregnated with the very atmosphere of his beloved Holstein. De la Motte Fouqué's prose poem *Undine* and Eichendorff's *Aus dem Leben eines Taugenichts* will add to the student's enjoyment. In ballads German poetry is rich. The easy rhythm and the simple and natural feeling of this kind of verse appeal especially to English readers. Uhland's *Lieder und Balladen* and the ballads of Bürger and Schiller will show him of what the German language is capable in this direction. The dramas of Goethe, Schiller, and Lessing stand on a higher plane, but no one who wishes to get a complete idea of German literature should fail to study them. Of all these, and of many of the works above-mentioned, well-annotated editions are published by the leading English firms. The student who wants the texts only can get all these, except those of living authors like Heyse, Frenssen, and Wilderbruch, and of works of later authors on which there is still copyright, in the collection published by Philipp Reclam of Leipzig. These are in paper covers, and published in parts of about 120 pages, which cost the English student 4d. each. We have naturally been obliged to leave many authors of sterling merit unnoticed, but the student who reads works of the character of those we have mentioned will be well repaid for his trouble. In concluding this series of papers, we take leave to express the hope that they have been in some degree helpful to our readers who are taking up the study of German.

THE EDITOR,
Practical Teacher. 9*th March* 1905.

SIR,—Prize distributions in public elementary schools are, as a rule, admitted during school hours, and as part of the registered school attendance. In some cases, although the scholars attend the school, the attendance is not marked and the occasion is a *dies non* so far as registration is concerned. Latterly, in London, and perhaps elsewhere, some of H.M. Inspectors have held that prize distributions were not in the nature of instruction, and therefore that the attendance of children at such a gathering could not be registered. The result of this ruling has not infrequently been to cause the prize distributions to take place after school hours, under circumstances of hurry and weariness and consequent lack of pleasantness and proper influence. At the request of the Committee of London Members of the Executive and of the Executive itself, I made representations upon this matter to the Board of Education and received a favourable reply. The following is a copy of the letter from the Board of Education, which I have forwarded to the Education Authority for London:—

BOARD OF EDUCATION, WHITEHALL,
LONDON, S.W.,
24*th January* 1905.

SIR,—You spoke to me some little time ago about a custom that exists in London of holding an annual Prize Distribution during school hours, at which parents are invited to be present, and at which an address is delivered by some member of the Education Committee or other person. You suggested that as the occasion is one of real educational value the Board should not insist upon the attendance made during that meeting of the school being cancelled. I am pleased to tell you that in future the Board will not make any such requirement, as they agree with you in thinking that the occasion is one of real value as tending to raise the tone of the school and to stimulate the ambition of those who fail to win a prize.—Yours very truly,
H. M. LINDSELL.

It follows from the above letter that prize distributions can take place during school hours, and that the calling up of children to receive marks of merit and the addresses made to the children by members of the Education Committee, teachers, and others are now regarded in their proper light as being methods of influencing parents and children in ways conducive to the efficiency and tone of a school.—I am sir, yours faithfully,
J. H. YOXALL, *Secretary.*

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

SCHOLARSHIP COURSE FOR DECEMBER 1905.

Fifth Month—May.

Important Notice *re* Scholarship Examination.

The Board of Education, by a circular dated March 28, have made important changes with regard to the Scholarship Examination. Pupil teachers whose engagement terminates on July 31, have at present either to take the Scholarship six months before the end of their engagement, or extend that engagement for six months. To obviate this to some extent the following arrangements have been made:—

1. The Examination for 1905 will be held on December 12 and following days, in accordance with the Regulations and Syllabus issued.
2. The 1906 Examination will be in two parts. Part I. will be held at the same time and place as the 1905 Examination. It will be open to candidates who intend to complete their examination by taking Part II. in April 1906.
3. Part I. (Dec. 1905) includes the subjects—Reading, Repetition, Arithmetic, Penmanship, Dictation, Drawing, Music, Needlework.

If this examination is passed then candidates may take—

4. Part II. (April 1906) Compulsory subjects: English Language and Literature, Geography, History, Composition. Optional subjects: Elementary Mathematics, including Algebra and Geometry, Elementary Science, one language.
5. There will be no complete King's Scholarship Examination in 1906.

These arrangements will probably affect many of our readers. If they are very sound in their work they may take the complete examination in 1905, but the majority will undoubtedly prefer to divide the work and take the Part I. in December 1905, and Part II. at Easter 1906.

The present course will be continued as for December, and the first three months of next year will be devoted to a thorough revision of the special subjects for Part I.

Work to be Prepared.

1. *Reading and Repetition.*—These subjects must receive careful attention and regular practice. As students who fail in Part I. will not be allowed to sit for Part II., special care must be taken with subjects of the first examination. Oral practice is very necessary.

2. *Teaching.*—Chap. v., *Scholarship School Management.—The Teaching of Spelling.*

English spelling is difficult—of this there is no doubt. The causes are not far to seek. Since English is a compound language with an Anglo-Saxon basis and a foreign superstructure, with many words from all languages, some confusion was bound to arise. The strife of tongues from 1066 to 1250 or 1300 is mainly responsible for this confusion. We have five vowels, but fifteen vowel sounds, spelt in over a hundred different ways; of the consonants, three (c, q, x) are redundant, and extra ones are needed.

At first it may appear to the young teacher a well-nigh hopeless task to teach correct spelling, but the difficulties disappear if the subject is taken in the right method. There are two cardinal principles to remember: (1) Spelling is taught mainly by the eye; (2) Difficulties must be grouped and classified.

Every pupil teacher is aware of the fact that when there is a doubt as to the spelling of a word, if the alternatives are written down the eye will recognise the correct form. A child will spell a word orally twenty times correctly and then write it wrongly. Therefore writing lists of words is a better way of teaching than spelling aloud. It is useless to attempt to teach each word and each difficulty as it occurs without any attempt at classification. A pupil spells *knew* as *new*; it is not enough to correct this, but the whole difficulty of the silent initial *k* should form the subject of a lesson, when *all* the common words containing this puzzle should be taught and explained.

Similarly with other instances. A careful teacher will be always preparing and practising such lists, evolving rules where possible, and giving plenty of written exercises thereon.

In the upper standards especially, great use should be made of word-building both as a means of teaching spelling and also to teach meaning. Take a common Latin root—*e.g. duco, ductum*, I lead—and let the class proceed to supply all the words they can containing the stem *duc* or *duct*, *e.g.* reduce, reduction, produce, reproduce, production, introduce, &c. &c., the force of the prefix or suffix in each case is elicited, and the meaning of the whole word. This develops the mental habit of pulling a word to pieces to see what it exactly means, and leads to the correct use of the word in composition.

Dictation, it must be remembered, is merely a *test* of spelling, and not in any way a means of teaching the subject. The text-book supplies further hints and a collection of questions set on this topic which should be thoroughly mastered.

3. *Drawing.*—Two copies each week—one a photograph of a cast, &c., and the other a sketch from Nature of flowers, fruit, foliage, &c., to fairly fill a half imperial sheet of paper (*i.e.* 22″ by 15″). Line in with brush and sepia. Smooth easy curves, and good proportion, are the main essentials. A common mistake in the copies submitted for criticism is the failure to recognise the continuance of a curve when hidden by a leaf. If you examine any copy you will find this point occurs very frequently. A curve is relieved by a leaf, &c., drawn across it, but the curve though hidden continues till it appears again, and in sketching the whole curve must be traced.

4. *Music.*—Translation of a passage into Tonic Sol-fa notation.

There is little difficulty in this. (1) Write the correct key; (2) notice the time, and prepare measures accordingly; (3) note the pitch of each note with relation to the tonic, and its duration. Take an example.

Write the following in Tonic Sol-fa—

The key is B flat, the time is Common or Four Pulse, the first note is soh. Prepare the measures first, and work out each note in pitch and time—

{:s, |s, :-.s, |fe, :s, |l, :—|s, :s, |s, :d |t, :d }

{|m :— |r :r| |s :-.m|f :m |r :de |r re }

{m :f .m |r :m .r |d :

Note particularly the octave marks, according to the particular notes. For practice take any hymn tunes in Staff notation and turn them into Sol-fa. Test by singing them through when written.

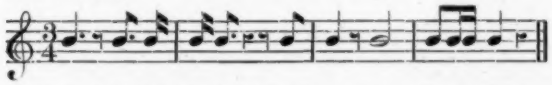
Work the following general paper for practice.

(1.) Write the following intervals above the notes given—

(2.) Write the following minor key signatures: B minor, C minor, F♯ minor, F minor, D minor.

(3.) Add bars to the following notes in accordance with the signature. Each passage commences with a complete bar.

(4.) Rewrite the following in $\frac{3}{2}$ time, doubling the value of each note and rest.



(5.) Explain briefly the following terms: Lento, Presto, Allegro, Dal segno, Legato.

5. *Penmanship.*—Write a page daily in the *Practical Teacher* Copy Book, and use great care at all times. Use good paper and ink, and a pen which you can write best with, and always use the same kind of pen. I shall be pleased to send a copy of Test Questions in Geography or History to the three students sending in the best specimen of copy setting:—

Large hand.—Egyptian Hieroglyphics.
Small hand.—"My name is Ozymandias, King of kings.
Look on my works, ye mighty, and despair."

6. *Composition.*—Write one or two essays each week on such subjects as:—

(*a*) The effects upon commerce of mountains and rivers.
(*b*) Pleasures and hardships of life in a new colony.
(*c*) Does our greater knowledge make us happier than our forefathers?
(*d*) Influence of trade upon the growth of a nation.
(*e*) The month of May.
(*f*) Common sense.
(*g*) Advantages and disadvantages of solitude.
(*h*) Birds and insects as friends to man.

Read up the subject if necessary, or in any case give it some amount of thought before commencing to write. Arrange your ideas in logical order, or draft a skeleton plan and express your thoughts in the best language at your command, avoiding slang and colloquialisms on the one hand and a stilted, artificial style on the other.

The following Notes may be of some assistance.

(*a*) Mountains act as barriers between countries unless they may be traversed by easy passes, viz. Pyrenees, Himalayas, &c. Indirectly they affect climate, which affects productions, which in turn influence the character of the commerce. Illustrate by reference to mountain chains.

Rivers, if navigable, are of great service, and become the highways of commerce. Refer to Rhine, Volga, Mississippi, &c.

(*b*) These may easily be imagined. The freedom from the restraints of civilisation, the open air life, the healthy exercise on the one hand, the absence of comforts on the other.

(*c*) This is a question which will always be debated. Happiness is a purely relative term. The negro basking in the tropical sun is probably as happy as the educated European. The more we know the more it takes to create happiness. The child is satisfied with a Punch and Judy show, the adult demands an elaborate stage production to produce the same feeling.

(*d*) It is impossible for a country to remain stationary while its trade is developing. Trade means communication with other countries, new ideas to be copied and improved upon. History furnishes many examples of this. Take the case of England in Elizabeth's time or the United States at a later date.

(*e*) Describe the weather, appearance of nature, flowers, &c.

(*f*) Explain the term. Analyse the meaning. "Common sense" is the acting in accordance with what the majority of men would do in similar circumstances. It is not innate, as often imagined, but the result of experience in repressing the impulses to act rashly and in using the second thoughts which are proverbially the best.

(*g*) Man is a dissatisfied animal. In the crowded streets of the city and under the stress of an eager life he echoes the old wish: "O that I had the wings of a dove, that I might flee away and be at rest." When compelled to live in solitude he pines for the companionship of his race, and says with Selkirk:

"O Solitude, where are the charms which poets have seen in thy face?
Better dwell in the midst of alarms than rest in this horrible state."

Like many other things it is good in the proper place—and in the proper amount.

(*h*) This is a very good subject. The part played by birds and insects in the economy of nature is enormous. Without them man would come but poorly off. The insectivorous birds keep down the myriads of insects which would otherwise make life unbearable. Insects again do very important work—some give useful products, flies act as scavengers, winged insects as fertilisers of blossoms, &c. Innumerable instances will occur with a very little thought. What becomes of the dead animals?

I shall be pleased to give a little prize for the best essay on one of the above subjects.

7. *English.*—(1) Learn 15 roots and meanings each week.
(2) The chief writers of the Stuart Period.
(3) *Henry V.*, Act III., Prologue, Scenes i. and ii.
(4) Prepare thoroughly the Essay on Travaille.
(5) The grammar of the verb.

Students should know something of the works of Bacon Milton, Butler, Clarendon, the Lyricists (Suckling, Drummond, Wither, &c.), Dryden, Pope, Addison, Steele, &c.

The reign of Anne was termed by those then living the "Augustan Age," implying thereby that literature had reached its high-water mark, as it did in Rome in the time of Augustus. From that opinion we differ strongly. It was the period of French influence, when "the stately tongue of England learnt to dance the minuet of France." The French Academy, founded in the middle of the seventeenth century, had been busily engaged in laying down rules which were to be followed, especially in the drama. The "Three Unities" were the test of a good play, viz., unity of Time, Place, and Action. The incidents should all occur within twenty-four hours, the scene should not change, and there should be only one tale in the play. Judged by this standard Shakespeare was not a dramatist at all. Consider *The Merchant of Venice.* The time covered is some months, the scene changes from one part of Italy to another, and there are three distinct tales incorporated—the Jew, the Caskets, and the elopement of the Jew's daughter. Yet these ideas obtained much influence in England and affected the whole of the poetry. More thought was spent on versification than on the sense, with the result that we read very little of the poetry of that period. Pope excelled, as he would in any age, but of his contemporaries we read very little and care less.

The rise of the newspaper will be given in a separate note.

(2) The prologue to this Act and the first scene of it are two of the finest passages in the play. The prologue, while effecting the continuity of thought, at the same time presents a fine word-picture of the fleet in motion, and arouses the patriotism of the audience. Scene 1, consisting of a spirited address by the King, is very well known. Although it may seem to us rather bombastic, it must be remembered that it would appeal strongly to English people at the time when the play was written, when the country was in the day-spring of hope and energy after having rid itself of the nightmare of foreign invasion. Scene 2 gives us the lighter vein, the undercurrent in the ranks, the view of the private soldier. In the following scene one gets a glimpse of the horrors of war at that time, as outlined by the King. They were rough times, when uneducated men knew little of mercy and moderation, and when the storming of a city was

inevitably followed by its sack, accompanied by disgraceful acts.

(3) There is much shrewd advice in the essay on Travel, but to appreciate it one must place himself in Tudor times. Education in England was far behind that on the Continent; it was all new, and had no records of centuries to interest and instruct. Consequently the "grand tour"—a journey through France, Italy, and Germany—was considered necessary to complete a gentleman's education. Very frequently the education was of the wrong sort. Young noblemen, with an easy-going tutor and a long purse, learnt more of the vices of the countries visited than they did of the virtues, and came back with a mixture of fantastic garments and debased morals, which brought upon them the contempt of the sober citizens. The Plays are full of references to this. See *As You Like It*, Act IV., Scene 1: "Look you lisp, and wear strange suits; disable all the benefits of your own country; be out of love with your nativity, and almost chide God for making you that countenance you are; or I will scarce think you have swam in a gondola." *Much Ado About Nothing*, Act III., Scene 2: "To be a Dutchman to-day; a Frenchman to-morrow; or in the shape of two countries at once, as, a German from the waist downwards, all slops; and a Spaniard from the hip upward, no doublet," &c.

It was to correct these habits that Bacon gives his very sensible advice. "It is strange," he says, "that in sea voyages men should make diaries." This is hardly so. As time hangs so heavily on hand in a long voyage, there is ample time; but when a man is engaged in visiting new places all day, he finds little opportunity of putting down all he has seen, and a young man at that time looked more for enjoyment than the compilation of a Baedeker.

Still the advice is sound, and shows that the writer was considerably in advance of his time.

(4) In revising the grammar of the verb, care should be taken to go more fully into the syntax and etymological significance of the words. The following points must be thoroughly understood:—

1. Classification (*a*) as transitive and intransitive.
   (*b*) as weak and strong.

Exact definitions must be learned. Note the intransitive verbs that are transitive when used in a causative sense; *e.g.* He *walked* his horse.

2. Voice, mood, and tense. Exact definitions again. Note what is sometimes called the middle voice; *e.g.* The door opened.

3. Auxiliary verbs and their proper use. Distinguish between *may* as an auxiliary of subjunctive mood and as a transitive verb; *e.g.* I may call upon him. You may go (*i.e.* You have permission to go). *Can* is not an auxiliary at all.

4. Defective verbs—those which are deficient in some part of their conjugation.

5. The gerund and participles.

6. The concord of verb with subject; *e.g.*:—
   The boy and the girl *are*.
   The boy or the girl *is*.
   The boys or the girl—*is* or *are*?
   The boy or the girls—*is* or *are*?

Look up the rules for this carefully.

8. *Geography.*—(*a*) Revise China, Japan, Russian Asia.
   (*b*) The British possessions in South Africa.

(*a*) In view of recent events, the revision of China, Japan, and Russian Asia must be done with great care. The solution of the three-cornered problem here is of the utmost importance to the future of the world.

It is comparatively rare that a proper appreciation is obtained of the size and importance of China. It contains an area of 4,278,000 sq. miles, and a population of 400,000,000 people; or, it is much larger than the whole of Europe, and contains about one-third of all the people on the earth. It is self-contained and self-supporting—a rich agricultural land, farmed with exceeding skill. The men are well educated (compared with other Eastern countries). It has not taken a prominent place in the world's politics, because of the national conservatism and exclusiveness; but there is no reason why the country, under proper leaders, should not take rank as the greatest power, and dictate terms to Western Europe.

Japan—"poor little Japan," as one often heard it called at the commencement of the war, is neither poor nor little. It has an area of 162,000 sq. miles, and a population of 45,000,000. It contains enormously rich deposits of mineral wealth, is very fertile, occupies a splendid position, and is properly called the Great Britain of the Pacific. Its people, unlike the Chinese, have since the Revolution of 1868 been eager to learn all that is useful from the West; and at the present day they are not only equal to, but considerably in advance of, European countries in many respects.

The present war with Russia has been conducted in a better manner than any European wars in the past, and there is every probability that, at the close of the war, Japan will be one of the nations of the world whose voice must be listened to in international matters. Had China developed at the same rate as Japan, the whole of Europe would find it difficult to withstand them. The cause of the war must be known, and a sketch map of the seat of operations committed to memory.

This section of the work must be thoroughly well done.

(*b*) British possessions in South Africa. Copy in your note-books and learn the following summary:—

Colony.	Area Sq. Mls.	Pop.	Imports.	Exports.	Towns.	Government.
Cape Colony .	376,995	2,500,000	Apparel, books, coal, cotton and woollen goods, furniture, hardware, leather, machinery, iron and steel, provisions, &c.	Minerals, hides, wool, ostrich feathers, grain, wine.	Cape Town, Grahamstown, Port Elizabeth, Kimberley, Beaconsfield, &c.	(1) Governor. (2) Legislative Council, 23. (3) House of Assembly, 95.
Basutoland. .	10,000	220,000	Blankets, hardware, grocery.	Grain, wool, cattle, horses.	Museru.	Commissioner.
Bechuanaland Protectorate	400,000	...	Do. do.	Mealies, wool, hides, cattle, wood.	Gaberones, Francestown, Serowe.	Do.
The Transvaal	111,700	750,000	Same as the Cape. (Mining and milling machinery being a large item.)	Gold, minerals.	Pretoria, Johannesburg, &c.	Governor. (As soon as circumstances permit, representative institutions leading up to self-government will be instituted.)
Orange River Colony	48,400	210,000	Do. do.	Wool, ostrich feathers, hides, diamonds, grain.	Bloemfontein.	Do.
Natal . . .	29,200	1,000,000	Do. do.	Angora hair, hides, skins, wool, sheep.	Pietermaritzburg, Durban, &c.	(1) Governor. (2) Legislative Council, 12 (3) Legislative Assembly, 43
Rhodesia . .	750,000	1,000,000	Machinery, provisions, clothing, cotton and woollen goods.	Minerals (valuable deposits, but little labour).	Salisbury, Bulawayo, Umtali, Gwanda, Gwelo, Victoria, &c.	The British South African Company.

The Cape to Cairo railway has been carried as far north as the Zambesi, which has just been bridged.

9. *History.*—Henry II., Richard, and John.

The reign of Henry II., the first Plantagenet or Anglican king, is an important one. The chief points to be noted are:—

(1) The extent of his possessions, from whom they were inherited. The French possessions were for the next 300 years a continual source of anxiety and war. It was impossible to fulfil the dreams of many kings and make a large part of France a part of England. Different races, with different languages and manners, separated by the sea, will not amalgamate. The cost of maintaining an army of occupation at so great a distance was more than England could afford, especially at a time when Wales and Scotland were hostile.

(2) Legal reforms. Henry was a strong king, imbued with a desire to establish a strong kingly rule.

1. Restoration of order. The "adulterine" castles erected in the previous reign were demolished, mercenaries banished, coinage reformed, royal lands resumed.

2. Constitutions of Clarendon, the object of which was to break down the power of the clerical courts, and make all churchmen amenable to the civil courts for offences against the civil law.

3. Introduction of Scutage, by which military service could be avoided on payment of a tax of two marks per knight's fee. With the money the king could hire soldiers. The first blow at the feudal system.

4. Inquest of Sheriffs, in which Henry took the office of sheriff out of the hands of the feudal nobility, and placed in the office men entirely dependent upon himself.

5. Assize of Arms, in which *every* freeman was compelled to assist the king if necessary. This was a revival of the Anglo-Saxon Fyrd, or a levy of the nation's fighting men *en masse*.

6. Assize of Clarendon. Established the jury system.

7. Assize of Northampton. Divided England into circuits, and established Justice in Eyre—a most important step.

(3) Becket, his life and aims.

(4) The so-called Conquest of Ireland.

(5) Revolt of Henry's sons, and invasion of the Scots.

Richard.—The reign of Richard was almost entirely occupied with the Third Crusade. At home, the government was in the hands of the Bishop of Durham and Longchamp, Bishop of Ely.

John.—(1) The loss of Normandy. Arthur of Brittany and his claim. John is often called a usurper because he was not the next male heir to the throne, but this is incorrect. It was one of the privileges of the Witenagemot and subsequently of the Magnum Concilium and Parliament to *elect* the king, *cf.* Harold, Stephen, Henry IV., &c.

(2) The quarrel with the Pope over the election of Archbishops. Students should notice the consistent opposition which the English Kings offered to the increase of Papal power in England. Distinguish carefully between "interdict" and "excommunication," and note why the latter brought John to his knees where the former failed.

(3) The quarrel with the Barons, who protested against John's illegal exactions under the Feudal System.

(4) The Great Charter—due to the wisdom and skill of Langton. Note particularly that the interests of *all* were considered, as *all* were combined against the King's tyranny. Learn the chief provisions. The weak point of the Charter was that it did not specify exact punishment for breaches of its stipulation, and consequently subsequent Kings (especially Stuarts) broke its provisions with impunity: *e.g.*, the clause, "*To none will we sell, to none will we deny or delay right and justice,*" was consistently ignored till the Habeas Corpus Act provided heavy penalties for its non-observance.

(5) The Civil War and the Fair of Lincoln.

10. *Arithmetic.*—Averages and per centages.

The greatest care must be taken with per centages to always reckon per centage on 100. This is often not done: *e.g.* A sells to B at a gain of 20, B to C at a gain of 5 per cent., C. to D at a gain of 50 per cent. What is D's buying price above A's in per centage? The answer is *not* 20+5+50=75. Assume A buys for 100, he sells for 120. B buys at 120 and sells at a gain of 5 per cent., or 5 on every hundred. This=6, ∴ he sells for 126. C sells for 126+50 per cent. of 126=189. Total gain=89.

Work through all the examples in the text-book, and send up any sums which present difficulty.

11. *Algebra.*—Simple equations and problems leading to the same.

Work the following paper:—

1. Show that

$$\frac{a^2b^2c^2-a^2b^2-c^2+1}{a^2bc-\frac{a}{b}+b\left(a^2-\frac{1}{b^2}\right)}+1=a^2 \text{ if } c=a+2 \text{ and } b=a-1.$$

2. Find the G.C.M of $a^5+4a^4b-4a^3b^2-14a^2b^3+ab^4+15b^5$ and $a^4+2a^3b-7a^2b^2+8ab^3-5b^4$.

Ans. $a^2+3ab-5b^2$.

3. Find the L.C.M of x^3-3x^2+3x-1 and x^3-x^2-x+1.

Ans. $(x-1)^2(x+1)$.

4. Simplify $\frac{a^2-ab}{a^3-b^3}\times\frac{a^2+ab+b^2}{a+b}+\left(\frac{2a^3}{a^3+b^3}-1\right)\left(1-\frac{2ab}{a^2+ab+b^2}\right)$

Ans. $\frac{2a-b}{a+b}$.

5. Prove that $\frac{a+b}{ab}\left(\frac{1}{a}-\frac{1}{b}\right)-\frac{b+c}{bc}\left(\frac{1}{c}-\frac{1}{b}\right)$ is the difference of two squares. Find its value when $a=1$ and $c=\frac{1}{2}$.

Ans. $\frac{1}{a^2}-\frac{1}{c^2}$; -3.

6. Find both the G.C.M and L.C.M of—

$x^3+3x^2y+3xy^2+y^3$, $x^3+x^2y+xy^2+y^3$, $x^3+x^2y-xy^2-y^3$,

and the G.C.M only of $2x^5+8x^4+12x^3+20x^2+10x+12$,

and $x^6-2x^5-2x^4+4x^3+x^2+6$.

Ans. G.C.M $x+y$

L.C.M $(x+y)^3(x^2+y^2)(x-y)$

G.C.M x^2+x+2.

Women.—Division. Work the examples in the text book.

12. *Euclid*, Book I., Propositions 20–24, with 4 deductions each week. Prove the following:—

(*a*) The four sides of any quadrilateral are together greater than the sum of the two diagonals.

(*b*) The two sides of a triangle are together greater than twice the straight line drawn from the vertex to the middle point of the base.

(*c*) AB AC are any two straight lines meeting at A. Through any point L draw a straight line meeting them in E and F, such that AE=AF.

(*d*) PQ is a final straight line, divided into any two parts at R. S is the middle point of PR, and T the middle point of RQ. Find the middle point of PQ.

Women.—Learn propositions 11, 12, 13, and 14.

13. *Science.*—Analysis of light by a prism, and recomposition. The spectrum and its peculiarities. Colour. The laws of reflection and refraction.

14. *Spellings.*—Learn 100 words per week from Words commonly Misspelt, Series C. or D.

Test Questions.

1. *English.*—

(1) Point out the mistakes in the following:—

(*a*) How sweet the moonlight sleeps upon this bank.

(*b*) I am sorry to differ with you.

(*c*) He is averse to the proposal.

(*d*) These are the two persons whom he thought were far away.

(*e*) O thou! who touched Isaiah's lips with fire.

(*f*) He partook of a good breakfast before starting.

(2) Mention the chief writers of the Tudor Period, and say what were their chief works.

(3) Analyse the following, and parse words in italics:—

But *though* we think *it so*, it is no matter,
In cases of defence 'tis best *to weigh*
The enemy *more* mighty *than* he seems;
So the proportions of defence are filled,
Which of a weak and niggardly projection
Doth, *like* a miser, spoil his coat with scanting
A little cloth.

(4) Explain the following:—Caveto be thy counsellor; Whitsun morris-dance; womby vaultages; quotidian tertian; "couple a gorge!"; steep their galls in honey.

(5) Explain clearly which adjectives have no degrees of comparison and why.

(6) Distinguish, with examples, between Reflexive, Emphatic, and Reciprocal Pronouns.

2. *Geography.*—

(1) Point out the natural advantages or disadvantages which any part of Asia possesses with regard to commerce.

(2) What are the chief islands in the East Indies? Give a full account of one of them.

(3) Draw a sketch map of Asia Minor, marking in the chief physical features, the chief towns, and the chief lines of communication. What are its chief exports?

(4) A steamer trades between Liverpool and the West African ports. What kind of cargo would she take out and bring back, and what time would the journey out occupy?

(5) Why is Egypt so intimately connected with us, and what have been the results of the British occupation?

(6) Describe generally the British possessions in Eastern Africa.

3. *History.*

(1) What was the Investiture Dispute, and how was it concluded?

(2) Give the chief points of Henry's Charter.

(3) What caused the Civil War in Stephen's reign, and what results had it on the country?

(4) Explain how armies, money, and ships were raised in the Norman period.

(5) Point out the chief law courts after the Conquest. How did they differ from Anglo-Saxon institutions of the same kind?

4. *Arithmetic.*—Work the following:—

(1) Divide £700 among A, B, and C, so that C may have one-fourth of what A and B have together, and A's share may be $2\frac{1}{2}$ times that of B.
Ans. £400, £160, £140.

(2) A, B, C, and D form a partnership. A subscribes £350, B £420, C £240, D £600. In nine months the profits are £364, 10s. 3d. How much should each get?
Ans. A £79, 4s. $10\frac{1}{13}$d., B £95, 1s. $9\frac{11}{13}$d., C £54, 6s. $8\frac{4}{13}$d., D £135, 16s. $10\frac{8}{13}$d.

(3) During three consecutive years a merchant's fortune has reached £54,000, each year yielding an increase of one-half of what it was at the commencement of the year. What had he to begin with?
Ans. £16,000.

(4) A man owning $\frac{1}{17}$ of a business, sold $\frac{3}{7}$ of his share for £$1\frac{13}{14}$s. What would be the value of $\frac{2}{4\frac{1}{4}}$ of $\frac{1}{4}$ of the business?
Ans. £1000.

(5) Find the cost of carpeting a room 18 ft. 9 in. long by 17 ft. 6 in. broad with carpet 2 ft. wide at 4s. 9d. per yard. Ans. £12, 19s. $9\frac{3}{11}$d.

(6) Express $\frac{1}{2}+\frac{1}{2\cdot4}+\frac{1}{2\cdot4\cdot6}+\frac{1}{2\cdot4\cdot6\cdot8}+\frac{1}{2\cdot4\cdot6\cdot8\cdot10}+\frac{1}{2\cdot4\cdot6\cdot8\cdot10\cdot12}$ as a decimal to 10 places.
Ans. ·6487196180$\dot{5}$.

5. *Science.*—

(1) A jug of warm water is placed on a table. How does it part with its heat.

(2) Describe some experiment which will show the effect of colour on absorption and radiation of heat.

(3) Trace carefully the changes in volume which a piece of ice at − 10° C. undergoes when melted and boiled off as steam.

(4) Radiation takes place on straight lines through media of the same density. Explain and illustrate this.

PUPIL TEACHERS' COURSE

For Candidates' Examination, 1906.

Work to be Prepared.

As the great majority of candidates will in future be admitted for two years only, this course is designed to cover the examination for admission to a *two* years' apprenticeship.

The following is the syllabus, with some notes as to text-books and methods of preparation.

1. *Reading.*—Any prose passage. Practise reading aloud before a competent critic for ten minutes each day.

2. *Recitation.*—One hundred lines by some standard English author. This should be selected from the poem chosen for study.

3. *English.*—Elements of English grammar. Analysis and parsing. First element of etymology. Paraphrase of an unseen passage. A short essay.

For the English grammar the student cannot do better than get Nesfield's Grammar (Macmillan). The etymology is fully covered by the *Pupil Teachers' English Note-Book*. No text-book is wanted for the paraphase; full notes and hints will be given in the course.

For essay-writing, the best book I know is Maxwell's Composition (Meiklejohn and Holden).

There is no special poem set for study, but each student should take some well-known poem, and use it as a basis for study and exercises. I propose to take Scott's *Marmion* for this year. There are many cheap editions of it.

For this month:—

(*a*) Learn exact definitions of the parts of speech.

(*b*) Read through the poem, so as to get an idea of the whole.

(*c*) Write an essay each week on such subjects as books, newspapers, money, holidays, &c.

Make up a skeleton outline first, and then write the essay in your best language.

4. *History.*—Outlines of English history from the Roman Invasion to 1603.

There are many excellent text-books which will do for this. It would be just as well to obtain a good one at first as to use a small book and have to buy a larger one later on.

A good synopsis of history is also very useful.

For this month read up all you can of Cæsar's Invasions; the Britons, their manners, customs, &c.; the Roman occupation and its results on the country and on the people.

5. *Geography.*—General knowledge of the geography of Europe and Asia.

The same remarks hold good with regard to text-books as above. Meiklejohn's little manuals on the continents will be quite sufficient.

For this month prepare thoroughly the general physical features of Europe—coast-lines, capes, bays, islands, straits, rivers, mountains, plains. Draw a large outline map, insert all names mentioned in the text-book, and go over them repeatedly till thoroughly known.

6. *Arithmetic.*—Arithmetic generally, excluding cube root, scales of notation, foreign exchange, true discount, troy and apothecaries' weight.

The best text-book by far is Christian and Collar's Arithmetic (Meiklejohn and Holden). Compiled specially for teachers, it is much better than any other book.

For this month read up carefully the chapter on factors, and work all the exercises given. Commit to memory the tests of divisibility of numbers.

7. *Algebra.*—Up to problems on simple equations.

Work through the exercises given in Chapter I. of Hall and Knight's Algebra (Macmillan).

8. *Geometry.*—Boys—Either: Book I. Euclid, with deductions; or, Practical Geometry.

All boy students should work both of these subjects, although they can only be examined in one.

For this month learn the definitions, axioms, and postulates.

Practical: Bisection of angles and lines, construction of perpendiculars.

9. *Music.*—Nelson's Music for Pupil Teachers covers all the ground that is necessary in Staff-Notation and Tonic Sol-Fa.

Learn the major scales and their signatures.

10. *Science.*—This is an optional subject, but should be attempted by every one. A very good book is *Elementary Practical Physics*, by Castle, or Simmon's *Experimental Science*.

For this month prepare measurement of curved and straight lines, use of scale and instruments; metric and British units of measurement; measurements of area by square and paper.

(A full set of Test Questions will be set next month, with some Notes on the last Examination.)

OUR CERTIFICATE COURSE FOR 1905.

BY GEORGE COLLAR, B.A., B.SC.,
Head-Master of Stockwell Pupil-Teacher School.

TEST QUESTIONS ON LAST MONTH'S WORK.

THEORY OF TEACHING.

1. Discuss the essentials of a good school desk.

2. Write notes of a lesson on each of the following:—(*a*) Salt, (*b*) India-rubber, (*c*) Coffee.

ENGLISH LITERATURE.

Describe the use made by the Court party of the "Middlesex Election" to extend their own influence.

English History.

1. Give a sketch of the "Industrial Revolution" in England.
2. What conditions enabled Great Britain to offer a successful resistance to Napoleon?

Geography.

1. Describe the continent of South America, under the heads of (1) shape and approximate size, (2) coast line, (3) mountain systems, (4) river systems, (5) climate.
2. Describe the basin of the Mississippi, mentioning the chief commercial towns that are situated on the river.

Arithmetic.

1. A watch loses 3 minutes in 24 hours; it is set right at noon on Monday; what is the correct time when it indicates $1\frac{1}{2}$ minutes past one o'clock on the following Wednesday afternoon?
2. If 20 men dig 18 acres in 9 days, how many acres will 14 men dig in 8 days?
3. At what rate of simple interest would £1510 amount to £1691, 4s. in three years?
4. An investor secures an annual income of £755 from a capital of £30,000 after paying income-tax at 8d. in the pound. What sum should be invested in like securities to yield the same income after paying income-tax at 1s. in the pound?

Geometry.

1. Prove that the straight lines which bisect the four angles of a parallelogram form a rectangle.
2. Describe a square whose area shall be equal to that of a given rectangle.
3. Describe a rectangle with one side twice the other which shall be equal in area to a given rectangle.
4. Give a construction for finding points on the circumference of a given circle, such that tangents drawn from them to another given circle are of given length. How many such points are there? When is this impossible?

Algebra.

1. Find x and y such that

$$x+y=9(x-y)$$

and

$$2x+y=3(2x-y)+1.$$

2. Find to three places of decimals a number such that three times its square exceeds eight times the number by unity.
3. Out of a flock of sheep a farmer sells a number so that he has $1\frac{1}{2}$ times as many left as he has sold; 15 of these die and then he has only half the original number. How many were there in the flock?

Elementary Science.

1. How would you show that air is a mixture, and not a compound, of oxygen and nitrogen? How would you obtain nitrogen from air? By what process can oxygen be obtained?
2. As a train draws up at a station on a rainy day, water flows from the roofs of the carriages by their front ends. As the train leaves the station the water flows off from the rear ends of the carriages. How do you account for this?
3. The flow of liquids through the body is regulated in certain localities by valves. Explain the action of a valve, and indicate where they are to be found in the body.

SYLLABUS AND NOTES FOR MAY.

The time for preparation for the examination is fast drawing to a close. The whole of the syllabus should have been completed before the end of May, and many parts of it should have been revised frequently. Next month we shall give a complete examination on the lines of the actual certificate examination; this will enable our readers to find out weak spots and to complete their revision.

English Composition.

Finish the text-book on this subject and revise those chapters which have seemed most difficult or which have afforded most help.

Prepare essays on the following subjects:—

1. A scientific education compared with a literary one.
2. Domestic animals.
3. Thrift; the duty and means of saving.

Theory of Teaching.

Finish the text-book, and pay special attention to the questions of "Physical Exercises" and "Nature Study," these being the subjects that are now being pressed in schools.

Teachers should endeavour to realise fully the dangers to which children are exposed in the matter of health, and to avoid the dangers and correct the faults that already exist. One of the most general means at the disposal of the teacher is physical training. The chief direct ends of physical training are health and symmetry of body and grace of bodily movements. Some people, however, deny that these are promoted by the gymnastic practices that have long been followed in our schools. Unquestionably these have led to the development of muscular strength and to the increased circulation of the blood. But our pupils need other and more important conditions of health. They need recuperation and rest from mental fatigue, and this is not gained by the tension of mind which is essential in executing gymnastic or quasi-military movements at the teacher's word of command. In most of our gymnastic exercises the recreative elements are wanting, and the lack of voluntary joyous response on the part of the child renders the exercises a dose of repulsive, as well as ineffective, medicine. This shows the superiority of games over drill, as the latter enable all the children to join in them voluntarily, and give abundant opportunity for free and emulative action. They are generally educative in their character, and exercise the children's powers of observation, imitation, memory, and judgment. Teachers should use every endeavour to encourage games requiring skill and to discourage games of chance, such as tossing with buttons, which only too frequently lead to gambling habits later on. The teacher should exercise great tact when joining in the games with his pupils: on the one hand he must sink his magisterial demeanour, but on the other must not allow undue familiarity. With tact and care he will rise greatly in the esteem of his class, and at the same time will have exceptional opportunities for child-study, and discover traits in the character of individual children which he would never dream of from seeing them only in the class-room.

If thirty minutes daily be taken for recesses and physical exercises, twenty minutes should be devoted to games and ten to gymnastic exercises or drill. If more time is desired for drill let it be taken from the study time. If we once admit, as indeed we must, that thought and feeling, volition and judgment, are inexpressible and ineffectual except through motor acts, and that motor acts are animated and controlled by the central nervous system, the inference is clear that physical training is an essential element in the development of mental health and power. Speaking of the beneficial effects of games in both intellectual and moral development, the American specialist Dr. Lincoln says (*Sanity of Mind*, p. 71):—"These games are well suited to bring out some of the basal traits of character and intellect—quick sight, dexterity of hand, agility, lung-power, voice, speed, endurance, with love of fairness, self-assertion, will-power, social instinct, and general experience of unveiled human nature."

Both in intellectual training and in physical training it is necessary to meet the needs of individual pupils. The defects of sight and hearing must be attended to, and if they are serious must be referred to a specialist. Of late years the duty of dealing with seriously defective children has been recognised, and special schools have been provided for them.

The student should carefully go through the courses of physical exercises that have been given in the *Practical Teacher*, and also the course of model physical exercises which has recently been issued by the Board of Education. One or more questions on physical exercises must be expected this year.

English Language and Literature.

One or other of the books set for general reading should be kept constantly in hand. It is advisable for the sake of variety to pass from prose to poetry, and so the following scheme is recommended:—(a) Scott's *Kenilworth*, (b) *Golden Treasury*, Bks. I. and II., (c) Thackeray's *Esmond*, (d) *Golden Treasury*, Bk. III., (e) Addison's *Sir Roger de Coverley Papers*, (f) *Golden Treasury*, Bk. IV. Notes taken on the first reading should be consulted, and additional ones made. In the prose works the student should not bother about the derivation of peculiar words, etc., but should of course not pass words without being quite sure of their meaning. He must be ready to describe the chief characters, and to give an account of important episodes, and of scenes described in the books.

Finish in detail Burke's *Thoughts on the Present Discontents*.

64. Difficulties in the way of distinguishing the real voice of the people from the outcries of disappointed factions, and importance of the Government appointments being assigned directly by the Crown.

65. No Government can expect the absolute support of every

man, but the art of governing consists in weighing the relative importance of oppositions.

66. If the King's advisers recommend measures leading to disorder the people must resist them, otherwise they will lose their importance and their freedom.

67. "We are in the great crisis of this contention" between the system of Court influence and the constitution.

68. Sometimes the people pardon an encroachment on their liberty if the Government is increasing the power of the state, but the present system is "making Ministers fearful of attempting, and incapable of executing, any useful plan of domestic arrangement, or of foreign politics."

Junto, a body of men joined together for a political purpose.

69. The Ministry is treated with contempt by foreign powers.

Corsica. This island had for a long time been under the control of the republic of Genoa, but under two leaders named *Paoli*, father and son, the Corsicans revolted against Genoese oppression. In 1768 the Genoese, who had invoked the assistance of the French, gave up their sovereignty to the latter, who soon subdued the island and retained possession of it. It is now a French department.

Manilla. This Spanish possession was captured by the British in 1762, but was restored to Spain by the Treaty of Paris, Feb. 10, 1763.

70. Foreign nations know of the splits in the Government and trade on them, as witnessed by the treatment of Lord Shelburne, our ambassador.

Causa sine qua non = an essential cause. *Sine* = without, *qua* = which, *non* = not,—a cause without which the thing cannot be.

71, 72. The same causes are alienating our colonies.

73, 74. Internal affairs are confused in the same way.

75. The system was introduced in order to protect the King's prerogative, "but has it in reality answered this purpose?"

76. The individual interest of the King is shown by the wealth he can accumulate, the wealth spent in pleasure, or charity, the respect shown to his person, and his private ease.

77, 78. It is evident to all that in spite of an income of nearly a million the King is able neither to save money nor to spend much on Court functions.

79. The Court party also subject the King to mortifications and indignities greater than any from which it professes to protect him.

80. This party endeavours to prove that the King does not govern in concurrence with the will of the people.

81. It has also discomposed the whole order and happiness of the King's private life.

82, 83. In no way are these people justified in styling themselves the *King's friends*.

Sycophant, an informer, or servile flatterer. It is derived from a Greek word meaning a "person who shows figs," which is sometimes said to mean a person who informed against those who exported figs from Attica (which was a trade forbidden by Athenian law). It may mean simply a man who showed the figs on a tree by shaking it, and hence a person who endeavours to extract benefits from the rich by flattery and other vile arts.

Quantum infido scurra distabit amico! How different a friend will be from a faithless buffoon.

84. Now consider the effect of this Court system on Parliament.

85–89. The House of Commons was originally intended as a temporary control over the other branches of the Government. And it would be better even that the House should be affected by popular frenzy than that it should be out of touch with the people. The King, Lords, and Judges are all representative of the people, but the Commons must reflect the spirit of the people. The want of accord between the House and the popular feeling is "a monstrous state of things in this constitution."

90. The principle of Parliament is corrupted, (*a*) by the indiscriminate support of all Ministers, and (*b*) by interference with the right of free election.

91. Circumstances have since the Revolution weakened the powers of Government and made Parliament more of a standing Senate.

92. Although this must be so to a certain extent it is not right to take Parliament farther from its original purpose. But the Court party does so and acts through Parliament with unlimited power.

93. Parliament should not be persuaded to assume the offices of executive government.

94. The *King's friends* tried to induce Parliament to alter the right of election itself by rejecting a man (Wilkes) duly elected, and by putting an unelected person in his place.

95–98. The case has been argued out, and if once the freedom of choice is taken away from the people, Parliament will cease to serve as a check on those in power.

99–102. Whatever may be said of the work and character of Wilkes, he has been punished not for indecency, libel, or blasphemy—seeing how many worse offenders have been left alone—but "for his resolute, indefatigable, strenuous resistance against oppression."

Breves et infaustos populi Romani amores. The short and unlucky loves of the Roman people.

103. "The House of Commons can never be a control on other parts of Government unless they are controlled themselves by their constituents; and unless these constituents possess some right in the choice of that House, which it is not in the power of that House to take away." The action against Wilkes was distinctly contrary to the law.

English History.

Prepare the history down to the death of Queen Victoria. Several books have recently been brought out dealing with the life and times of Queen Victoria, and one of these should be carefully studied in addition to the ordinary text-book. During the lifetime of the late Queen examiners seemed loath to set questions dealing with the reign, but now the tendency is to go to the other extreme, and of course the reign was a very important one from every point of view.

Geography.

Finish the Geography of America, and study that of Australia and the chief islands of the world.

Arithmetic.

Go carefully through chapters xxviii., xxxiv., lvi.-lix. in Christian and Collar's Arithmetic. This will show you how to manage the problems that are set. The Certificate Arithmetic paper generally contains some carefully drawn up problems, which test the candidate's common sense as well as his knowledge of arithmetic. We do not think that a better preparation can be had at this time of the year than the careful working through of the problems given at the end of the above chapters. Should there be any which the student cannot manage he will find solutions to them all in the *Key*.

The following questions were set last year:—

1. An upholsterer when making up a carpet is careful that the pattern on either side of the seam corresponds, and never joins the carpet except along seams running the length of the room. What length of carpet 27 inches wide will be needed to make up an oblong 17′ 6″ by 15′ 0″, supposing that the pattern repeats every 2 feet and that nothing is allowed for turnings?

As the seams must run the length of the room, the width of the carpet, 27 inches, will go into the width of the room, 15 feet, 6$\frac{2}{3}$ times, that is to say, seven widths must be bought. As the pattern repeats every 2 feet every length of carpet, *except the first*, must be the next highest multiple of 2 feet above 17′ 6″, that is, 18′ 0″. Hence it will be necessary to take six widths each 18 feet long and one width 17 feet 6 inches long, total = 125 feet 6 inches.

Many candidates seem to have overlooked the fact that no allowance for matching the pattern is necessary when laying the first width of carpet.

2. A manufacturer selling £100,000 worth of goods per annum finds that 10 per cent. of the receipts are profit, 30 per cent. is spent on fixed charges independent of the quantity of goods manufactured, while the remainder is spent on materials and wages directly proportional to the quantity manufactured. Find the value of the goods that must be sold before any profit is made. If the manufacturer sells this quantity at the original price and the remainder of his original production at 20 per cent. reduction, find the yearly profit. What would be the profit or loss if he sold the whole at the reduced price?

The length of the question itself may have frightened some candidates, but divested of its formalism, it means that of £100,000 received for goods £10,000 was net profit, £30,000 was paid in fixed charges, *e.g.* rates, taxes, and £60,000 was the cost of labour and materials. So that on £60,000 worth of materials there was a gross profit of £40,000. Now unless the gross profit had been £30,000 there would have been no net profit, as all would have gone in fixed charges. Hence we want to find (i.) what amount of material would produce £30,000 gross profit. Evidently this is $\frac{3}{4}\frac{0}{0}\frac{0}{0}\frac{0}{0}$ of £60,000 worth, *i.e.* £45,000. This would sell for £45,000 + £30,000 = £75,000. (ii.) If the remaining £25,000 of goods had been sold at 20 per cent. reduction, they would have fetched £20,000. Hence the total selling price would have been £95,000 instead of £100,000, and the profit would have been £5000 instead of £10,000, and as the latter was a profit of 10 per cent. of the receipts the former is a profit of

5 per cent. of the receipts. This might be expressed as a percentage of £90,000, the outlay necessary to produce it, but the question is satisfied by the total profit, £5000.

Answers:—(i.) £75,000, (ii.) £5000.

3. A man invests £10,000 at par, and after paying income-tax on the interest, finds that he receives $3\frac{1}{2}$ per cent. on his capital; but when the income-tax is reduced by 4d. in the £ he receives $3\frac{9}{16}$ per cent. on his capital. What was the rate of interest on the stock and how much in the £ was the income-tax?

4d. in the £ of his interest $= (3\frac{9}{16} - 3\frac{1}{2})\%$ of his capital.

$\therefore$ 240d. in the £ of his interest $= \frac{1}{16} \times 60\%$ of his capital.

240d. in the £ = the whole, and $\frac{1}{16} \times 60\% = 3\frac{3}{4}\%$.

$\therefore$ The interest was at the rate of $3\frac{3}{4}\%$.

But this was reduced to $3\frac{1}{2}\%$ by the tax.

$\therefore$ the tax was £$\frac{1}{4}$ on £$3\frac{3}{4}$ = £$\frac{1}{4} \div 3\frac{3}{4}$ = £$\frac{1}{15}$ = 1s. 4d.

Answers:—(i.) interest $= 3\frac{3}{4}\%$, (ii.) original tax = 1s. 4d. in the £.

GEOMETRY.

The following questions were set last year:—

1. Divide a given straight line in such a way that the square on one part shall be equal to the rectangle contained by the whole line and the other part.

State the numerical value of the parts, if the whole line is two inches long.

The problem is Euclid II. 11.

The second part can be worked by algebra. If x be the number of inches in one part of the line then $2-x$ will be the number of inches in the other.

$\therefore 2x = (2-x)^2 = 4 - 4x + x^2$.

$\therefore x^2 - 6x + 4 = 0$.

$$\therefore x = \frac{6 \pm \sqrt{36-16}}{2} = \frac{6 \pm \sqrt{20}}{2} = \frac{6 \pm 2\sqrt{5}}{2} = 3 \pm \sqrt{5}.$$

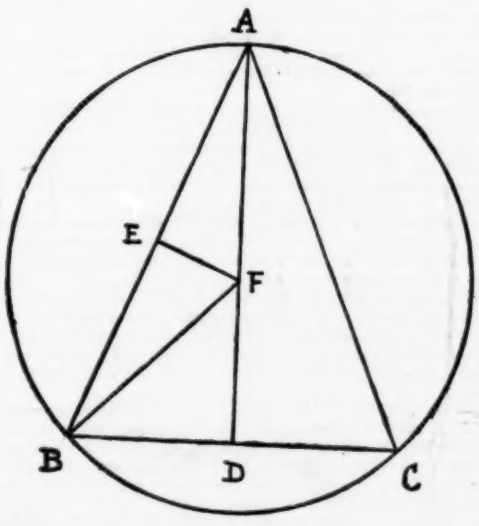
It is interesting to note that there are *two* results. If the line is divided internally as in Euclid, we must take the lower sign and we have $3 - \sqrt{5}$ for one part and $2 - (3 - \sqrt{5})$ or $2 - 3 + \sqrt{5}$, that is $\sqrt{5} - 1$ for the other part. If we take the upper sign we obtain a line $(3 + \sqrt{5})$ inches long, which is greater than the given line. This shows us how we might produce the line so as to divide it externally to fulfil the given conditions, that is, to produce a line so that the rectangle contained by the whole line thus produced and the given line shall be equal to the square on the part produced.

2. Describe a circle about a given triangle.

Find the radius, if the sides measure 13, 13, and 10 inches.

For the problem see Euclid IV. 5.

In the particular case given we have BA = AC = 13 inches, and BC = 10″, and therefore BD = 5″.



By I. 47. $AB^2 = BD^2 + AD^2$,

$169 = 25 + AD^2$

$\therefore AD = 12''$.

We are required to find the length of BF or AF.

Let BF = AF = x, then FD = $12 - x$.

and by I. 47, $BF^2 = BD^2 + FD^2$

that is $x^2 = 25 + (12-x)^2$

$x^2 = 25 + 144 - 24x + x^2$.

$\therefore 24x = 169$

or $x = \frac{169}{24} = 7\frac{1}{24}$.

Answer, the radius $= 7\frac{1}{24}$ inches.

ALGEBRA.

The following examples were set last year:—

1. Simplify $\dfrac{x^3 - 2x + 2}{x^3 - 3x + 2} - \dfrac{x^3 + 2x - 2}{x^3 + x - 2}$.

The numerators will not factorise, but the denominators will.

$$\frac{x^3 - 2x + 2}{(x-1)(x-2)} - \frac{x^3 + 2x - 2}{(x+2)(x-1)}$$

$$= \frac{(x+2)(x^3 - 2x + 2) - (x-2)(x^3 + 2x - 2)}{(x-1)(x-2)(x+2)}$$

$$= \frac{(x^3 - 2x + 4) - (x^3 - 6x + 4)}{(x-1)(x-2)(x+2)}$$

$$= \frac{4x}{(x-1)(x-2)(x+2)}$$

2. Solve the equations—

(a)
$$\begin{cases} \dfrac{x}{p-q} + \dfrac{y}{p+q} = \dfrac{p^2+q^2}{p^2-q^2} & \text{(i.)} \\ x + y = p + q & \text{(ii.)} \end{cases}$$

Multiply the first equation by $p^2 - q^2$.

$$x(p+q) + y(p-q) = p^2 + q^2 \quad \text{(iii.)}$$

but from the second $y = p + q - x$. (iv.)

substituting this in (iii.)

$$x(p+q) + (p+q-x)(p-q) = p^2 + q^2 \quad \text{(v.)}$$

$$px + qx + p^2 - q^2 - px + qx = p^2 + q^2$$

$$2qx = 2q^2$$

$\therefore x = q$

consequently $y = p$.

(b) $$amx - \frac{nx}{b} = bx - c$$

multiply by b, $abmx - nx = b^2x - bc$

or $(abm - n - b^2)x = -bc$

$$\therefore x = \frac{-bc}{abm - n - b^2} = \frac{bc}{b^2 + n - abm}$$

Notice that by multiplying numerator and denominator of the result by -1 we are able to write it in a better form.

$(x-3)(x-2) + (x-2)(x-1) - 1 = 1 - (x-3)(x-1)$,

$x^2 - 5x + 6 + x^2 - 3x + 2 - 1 = 1 - x^2 + 4x - 3$,

$\therefore 3x^2 - 12x + 9 = 0$,

$x^2 - 4x + 3 = 0$,

$(x-1)(x-3) = 0$,

$\therefore x = 1$ or 3.

ELEMENTARY SCIENCE.

We give one of the questions from last year's paper, with model answer to it.

What do you understand by elasticity? How could you show experimentally that such bodies as steel wire, catgut, and indiarubber possess this property?

Elasticity is the tendency that bodies have to recover their original form when they have been compelled to part from it.

The elasticity of steel wire may be shown in a variety of ways: (i.) If the wire is fairly thick one end may be fastened and the wire bent, and it will be found on releasing it that the wire recovers its original position and resumes its original form. (ii.) If the wire is fairly thin it may be coiled into a spiral which can be stretched and will recover its original form when the stretching force is taken off. (iii.) The wire may be fastened at its two ends and stretched; if it is then struck or plucked near the middle it will vibrate, and if the length and stress are suitable it will give out a musical note.

The last experiment may be used to show the elasticity of catgut, as in a violin or harp string. Evidently the string is lengthened when it is pulled out of the straight line, and it is the elasticity which makes it recover its original length.

A piece of indiarubber may be bent, pressed or pulled, and in each case it will recover its original form when the force is removed.

Indiarubber is a very convenient substance to use in lessons on elasticity, but its elasticity is not so great as that of steel—*i.e.* the force with which it tends to resume its original condition is much less than that brought into play in the case of steel.

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CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

Strengths of Acids.

It is usual amongst chemists to regard such acids as carbonic acid, acetic acid, and tartaric acid as weak acids, and acids such as sulphuric, nitric, and hydrochloric acids as strong acids, and such a view can be justified on many grounds. The difference in the behaviour of these two classes of acids is very great and no mistake is likely to be made. When, however, we come to compare sulphuric acid with another strong acid like hydrochloric we find that at first sight it is not easy to say which of the two acids is the stronger. The rough plan very frequently adopted for finding which of two acids is the stronger is to try to displace one acid from its salts by the other, but this method must be applied very cautiously or erroneous ideas may be formed. As an example of the difficulties which may arise unless the method is properly applied the following may be mentioned:—

If to a solution of mercurous sulphate in water we add an equivalent of hydrochloric acid, mercurous chloride is precipitated and sulphuric acid set free. On the other hand, if to a solution of barium chloride in water we add an equivalent of sulphuric acid, barium sulphate is precipitated and hydrochloric acid is set free. We see, therefore, that in one case the hydrochloric acid turns out the sulphuric and in the other the sulphuric turns out the hydrochloric.

Another example of the same kind is the case of sulphuric acid and hydrosulphuric acid and their salts of copper and strontium. If to a solution of cupric sulphate we add hydrosulphuric acid, black copper sulphide is precipitated and the sulphuric acid is set free. On the other hand, if to a solution containing strontium sulphide we add an equivalent of sulphuric acid, strontium sulphate is precipitated and practically all of the hydrosulphuric acid is set free. It will be noticed, however, in these and other apparently anomalous cases that one of the products of the reaction is removed from the sphere of action.

In the first case quoted above the mercurous chloride which is precipitated is removed from solution and therefore no longer has any effect. Similarly the barium sulphate, the strontium sulphate, and the copper sulphide are removed.

We may quote other cases of this curious reversal in which one of the products is removed through being easily volatilised. For instance, if to a solution of sodium silicate in water we add hydrochloric acid, silicic acid is set free. On the other hand, at high temperatures silicon dioxide or silicic anhydride in the presence of steam will act on sodium chloride and displace hydrochloric acid. This fact is utilised in the glazing of earthenware. In the same way, at high temperatures boric acid or phosphoric acid will drive out hydrochloric and sulphuric acid. The explanation of these facts is probably as follows:—Nearly all cases of chemical reactions may be regarded as balanced actions. If, for example, we take a solution of sodium sulphate and add hydrochloric acid to it, the sulphuric acid gives up part of its potassium to the hydrochloric acid, so that in the solution we have sodium sulphate, sodium chloride, sulphuric acid, and hydrochloric acid as well as the ions into which they partially dissociate. For any given temperature and concentration of solution these different substances will remain in the same proportion to each other. If one of the constituents is removed (say the sulphuric acid by adding a small quantity of barium chloride) the equilibrium is disturbed and more sodium chloride is formed.

If sufficient barium chloride is added scarcely any sulphate will be left in solution and practically all the sodium will be left as sodium chloride or its ions. We must remember, however, that the reaction is not absolutely complete, for barium sulphate is soluble to a slight extent in water, and therefore a small trace of sulphate will still be left in solution. For practical purposes, however, we may regard the reaction as complete.

In a similar way in the first reaction considered above, if the mercurous chloride were not practically insoluble in water an equilibrium would be established in which part of the mercury would remain as sulphate and part as chloride. As, however, the mercurous chloride is precipitated and removed from the sphere of action, the equilibrium is not established until practically all the sulphate has been converted into chloride.

In the case of the barium chloride and sulphuric acid, similar reasoning applies. In the case of copper sulphate and hydrosulphuric acid, an equilibrium should be established between the copper sulphate, copper sulphide, sulphuric acid, and hydrosulphuric acid and their ions, but the state of equilibrium is never reached until practically all the copper is removed as sulphide owing to its insolubility.

In the case of the strontium sulphide and sulphuric acid it is the sulphate which is insoluble, and as this is precipitated, the hydrosulphuric acid continues to give up more and more of the strontium, but the equilibrium is never established until practically all the strontium has been removed. In the case of a weak acid like silicic acid displacing a strong acid like hydrochloric acid at high temperatures, this is due to the volatility of the hydrochloric acid. The hydrochloric acid is vaporised and thus removed from the sphere of action. At lower temperatures, when the hydrochloric acid is not volatilised, silicic acid, if added to a solution of sodium chloride, would displace only an exceedingly small quantity of hydrochloric before an equilibrium was established, as hydrochloric acid is so very much stronger than silicic acid.

It is because of the non-volatile character of phosphoric acid and boric acid that these weak acids in a similar way are able to practically completely displace strong acids like sulphuric, hydrochloric, and nitric acids at high temperatures, while these acids almost completely displace boric and phosphoric acids in solutions at ordinary temperatures.

Carbonic acid can replace acetic acid from acetates in solution to some extent although it is a weaker acid, but the reaction does not go far if all the products of the reaction remain in solution, as an equilibrium is soon established.

From what has already been said, it is evident that if we are to employ this *method of displacement* for comparing the relative strengths of acids, we must select such reactions that all the reacting substances and the products of the reaction remain in solution, so that both acids are acting under comparable conditions.

If we do this, however, how can we tell what proportion of the base is taken by each acid? We cannot see what is taking place, nor can we in any way separate the substances so as to estimate them without destroying the equilibrium by doing so. A number of very ingenious and instructive methods have been devised for making measurements of the changes which take place. Several of these depend for their application upon the physical properties of the solutions, and some on the chemical properties.

Actual measurements show that the state of equilibrium is the same, no matter in what order the solutions are mixed; for

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instance, with a mixture of sodium chloride and sulphate with the corresponding acids, the properties of the solution are the same whether we add the sulphuric acid to sodium chloride or hydrochloric acid to an equivalent quantity of sodium sulphate.

Now, when two solutions which act on each other are mixed together, there is generally an evolution or absorption of heat and a corresponding temperature change. By taking advantage of this fact, Thomsen was able to devise a method of estimating the amount of chemical action which had taken place. Again, when reacting solutions are mixed, there is nearly always a change in volume. Ostwald took advantage of this fact, and based on it a volume method of estimating the extent to which the reaction had gone before equilibrium was reached. Other methods depend upon the rate at which the solutions cause sugar solutions to be inverted, upon the catalysis of methyl acetate or upon the electrical conductivity of the solution.

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

SPECTROSCOPY—(*Continued from p.* 481).

HAVING determined the angle of the prism, we remove the prism from the table and place a sodium flame opposite the slit. The telescope is now turned to view the slit and the position of the telescope read when the image of the slit is on the cross wires. We will call this the direct reading. The prism is now placed on the table approximately in the position shown in fig. 1 so that the light coming

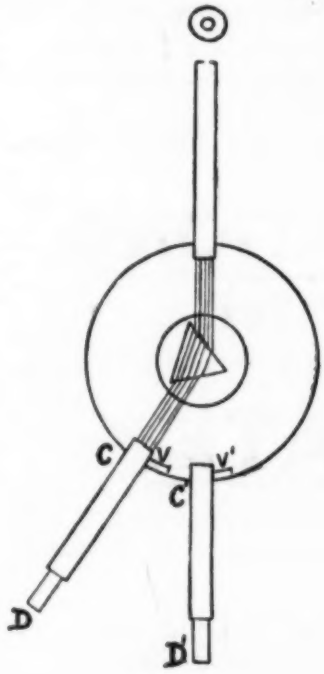

FIG. 1.

from the collimator enters one face of the prism and emerges from the other. The telescope is now turned to receive the emergent beam and a yellow image of the slit is seen. The table of the spectrometer is now slowly rotated and the image of the slit followed by the telescope. It will *generally* be found that rotating the table in one direction causes the image of the slit to move in one direction, while rotating it in the opposite direction causes the image also to move in the corresponding direction. It will be found, however, that there is one position such that no matter in which direction the table is turned the emergent beam moves away from the position C'D' occupied by the telescope when the direct reading was taken.

Let CD represent the position of the telescope when adjusted so that the image is on the cross wires for this particular position of the prism. The angle between this position and the position C'D' of the telescope for the direct reading is called the angle of minimum deviation, because then the beam of light issuing from the collimator is deviated to the least possible extent from its original direction by the prism. Take the reading of the vernier in this position and find the difference between this and the direct reading. This then gives us the value of the angle of minimum deviation produced in sodium light by this particular prism.

Direct measurement shows that when the prism is in the position of minimum deviation the incident beam falling on the prism makes the same angle with the face of the prism on which it falls as the emergent beam makes with the face from which it emerges, and the beam in passing through the prism is equally inclined to the two faces.

Having now obtained the angle of the prism and the angle of minimum deviation for sodium light, we are in a position to calculate the index of refraction of the glass of which the prism is made for sodium light.

In fig. 2 ABC represents the prism, DE the incident ray, EH the ray within the prism, and HG the emergent ray. The ray EH is passing through the prism in the position of minimum deviation, and it therefore makes equal angles with the two

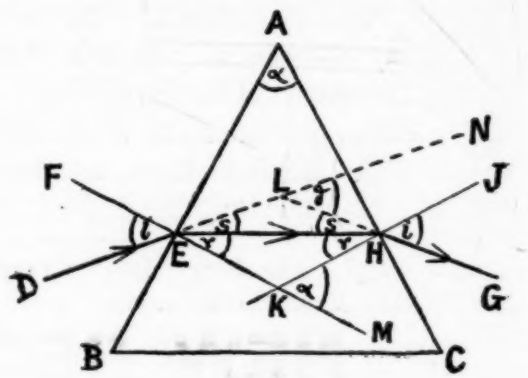

FIG. 2.

sides AB and AC. FEKM is the normal to the face AB at the point where the incident ray enters. The angle DEF therefore = i the angle of incidence, and the angle KEH = r the angle of refraction. Similarly JHK is the normal to the face AC at the point H where the emergent ray leaves the prism, and the angle EHK = r the angle of refraction in the prism (for the ray EH makes equal angles with the two faces AB and AC and therefore also makes equal angles with FEK and JHK the normals to these).

The angle JHG is also equal to the angle FED, that is to the angle of incidence. The lines FEKM and JHK being respectively at right angles to the lines AB and AC make the same angle with each other that the lines AB and AC do, therefore the angle MKH is equal to the angle BAC or the angle of the prism.

Produce DE to N, then DEN is the original direction of the ray before entering the prism. Produce GH to meet DEN in L, then LHG is the direction of the ray after emergence and the angle GLN is the angle through which the ray is turned by the prism, that is, it is δ the angle of minimum deviation.

Now, since the angle MKH (that is the angle α) is the exterior angle of the triangle KEH it is equal to the sum of the two interior and opposite angles of the triangle, that is—

$$\text{the angle } \alpha = 2r \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{(i.)}$$

$$\therefore r = \tfrac{1}{2}\alpha \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{(ii.)}$$

Also since the angle HLN (that is the angle δ) is the exterior angle of the triangle LEH, it is equal to the sum of the two interior and opposite angles of the triangle, that is

$$\delta = 2s \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{(iii.'}$$

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Now the angle DEF (that is the angle i) is equal to the two angles LEH and KEH, that is to two angles r and s, for these make up the opposite angle LEK.

$$\therefore i = r + s$$

$$\text{or } 2i = 2r + 2s. \quad . \quad . \quad . \quad . \quad \text{(iv.)}$$

but from (i.) $2r = a$ and from (iii.) $2s = \delta$,

therefore $$2i = a + \delta$$

$$\therefore i = \tfrac{1}{2}(a + \delta).$$

Now the index of refraction

$$\mu = \frac{\sin i}{\sin r}$$

therefore $$\mu = \frac{\sin \frac{1}{2}(a + \delta)}{\sin \frac{1}{2}a}.$$

Since a and δ have both been measured on the spectrometer we are able to calculate the index of refraction of the glass for sodium light. In a similar way we can determine the index of refraction of the prism for any line in the spectrum of a substance.

It is sometimes necessary to determine the index of refraction of a liquid for some particular ray. This can be done just as for the solid glass prism, if the liquid is placed in a hollow prism the sides of which are made of parallel plate-glass. In order to make the method of calculation perfectly clear, we give the following example:—

A prism was placed on the table of the spectrometer and three determinations of the angle were made. The following were the readings—

(a)	right +	4° 12′
	left −	115° 46′
		2)119° 58′
		59° 59′
(b)	right	6° 20′
	left −	113 40′
		2)120° 0′
		60°
(c)	right	8° 21′
	left −	111° 41′
		2)120° 2′
		60° 1′

The mean of the three determinations gives the angle of the prism as 60°.

The direct reading was then taken and found to be − 37° 54′.

After adjusting the prism to the position of minimum deviation, the corresponding reading was found to be − 86° 20′.

The angle of minimum deviation is the difference, that is 80° 20′ − 37° 54′, or 48° 26′.

Hence the index of refraction,

$$\mu = \frac{\sin \frac{1}{2}(60° + 48° 26')}{\sin 30°}$$

$$= \frac{\sin 54° 13'}{\sin 30°}.$$

Taking the sines of these angles from a table of sines we get

$$\mu = \frac{\cdot 8105}{\cdot 5} = 1\cdot 621.$$

THEORETICAL MECHANICS.

Stages 2 and 3, and Intermediate Science, London University.

BY FRANK CASTLE, M.I.M.E.,

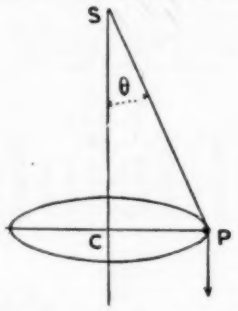
Royal College of Science; Lecturer on Mechanics, etc., Morley College, London; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Conical Pendulum.—A conical pendulum in its simplest form may consist of a piece of fine cord or thread fixed at one end S, and carrying at the other a small body P of mass m which is made to move in a horizontal circle.

Let CP (the radius of the circle in which the body moves) be denoted by r, and let h denote the height CS and l the length of the cord.

The three forces acting at P are the weight mg, the force $F = \frac{mv^2}{r}$ maintaining the circular motion, and the tension T of the cord.

These forces may be represented by a triangle having its sides parallel to SC, CP and PS respectively. If h on any convenient scale be made to represent w or mg, then CP and PS to the same scale, will represent $\frac{mv^2}{r}$ and T respectively.



Hence we obtain the relation—

$$mg : \frac{mv^2}{r} = h : r$$

$$\therefore \frac{v^2}{r^2} = \frac{g}{h} = \omega^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1).$$

We may replace the constant ω by its equivalent $\frac{2\pi}{t}$ where t is the periodic time of one revolution of P—

$$\therefore \frac{2^2\pi^2}{t^2} = \frac{g}{h}$$

$$\text{or } t = 2\pi\sqrt{\frac{h}{g}} \quad . \quad . \quad . \quad . \quad . \quad (2).$$

Ex. 1. Determine the velocity and period of a revolution in a conical pendulum, when the weight is swung round on the end of a thread a feet long in a horizontal circle of radius b feet. (Inter. Science, 1902.)

From (1) we obtain—

$$v^2 = \frac{gr^2}{h}.$$

Substituting b for r—

$$v = bg^{\frac{1}{2}}h^{-\frac{1}{2}}.$$

Also from the right-angled triangle CPS, $h^2 = a^2 - b^2$.

$$\therefore v = bg^{\frac{1}{2}} \times (a^2 - b^2)^{-\frac{1}{2}}.$$

Similarly substituting in (2)—

$$t = 2\pi\sqrt{\frac{(a^2 - b^2)^{\frac{1}{2}}}{g}}$$

$$\text{or } t = 2\pi(a^2 - b^2)^{\frac{1}{4}} \div g^{\frac{1}{2}}.$$

Ex. 2. Determine the period and velocity of a conical pendulum in which the plummet is swung round by a thread l feet long at an angle a to the vertical.

Calculate the length of the equivalent simple pendulum making small plane oscillations. (Inter. Science, 1903.)

If h is the height of the cone r the radius of the circle described, then the velocity v may be obtained from the relation—

$$v^2 = \frac{gr^2}{h}.$$

As $h = l\cos a$ and $r = l\sin a$ we obtain by substitution—

$$v^2 = \frac{g \times l^2 \sin^2 a}{l \cos a}$$

$$\therefore v = \sin a\sqrt{gl \sec a}.$$

If t denotes the period then $v = \omega r = \frac{2\pi}{t} \times r$

$$\therefore \frac{2\pi}{t} \times l\sin a = \sin a\sqrt{gl \sec a}$$

$$\text{or } \frac{t}{2\pi \times l\sin a} = \frac{\sqrt{\cos a}}{\sin a\sqrt{gl}}$$

$$\therefore t = 2\pi\sqrt{\left(\frac{l\cos a}{g}\right)}$$

Comparing this result with the period of vibration of a simple pendulum making small oscillations, we find, if l^1 is the length of the simple pendulum $t = 2\pi\sqrt{\frac{l^1}{g}} = 2\pi\sqrt{\frac{l\cos a}{g}}$.

Hence $l^1 = l\cos a$.

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(C. Smith's *Conic Sections*).

The given equation may be put in the form

$$4x^2 - 6x + 2y^2 = o.$$

$$\text{or } x^2 - \tfrac{3}{2}x + \frac{y^2}{2} = o.$$

$$\text{or } (x - \tfrac{3}{4})^2 + \frac{y^2}{2} = \tfrac{9}{16}.$$

The last equation becomes

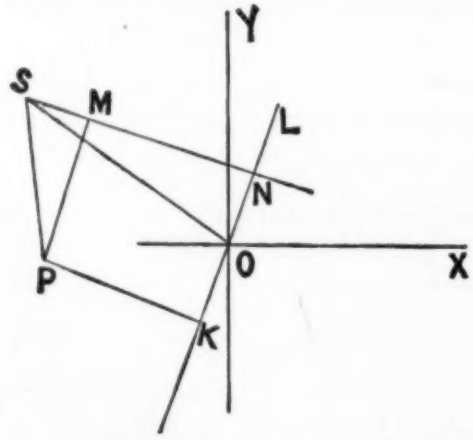
$$\frac{(x - \frac{3}{4})^2}{\frac{9}{16}} + \frac{y^2}{\frac{9}{8}} = 1 \quad . \quad . \quad . \quad . \quad . \quad (1.)$$

on dividing by $\frac{9}{16}$.

Referring (1) to parallel axes through the point $(\frac{3}{4}, o)$ the equation becomes

$$\frac{x^2}{\frac{9}{16}} + \frac{y^2}{\frac{9}{8}} = 1 \quad . \quad . \quad . \quad . \quad . \quad (2.)$$

Now (2) is the equation referred to the centre of an ellipse whose minor axis coincides with the x axis of co-ordinates, and whose major axis coincides with the y axis.



The length of the semi-axis minor is therefore $\frac{3}{4}$. But we have shown that the old origin is distant $\frac{3}{4}$ from the centre; hence it is at an extremity of the minor axis.

$$\text{The eccentricity} = \sqrt{\frac{(\frac{9}{16} - \frac{9}{16})}{\frac{9}{8}}} = \sqrt{\frac{\frac{9}{16}}{\frac{9}{8}}} = \frac{1}{\sqrt{2}}.$$

Since the given line passes through the origin let it be represented in the figure by OL. Let S represent the given point $(-1, 1)$. Draw SN perpendicular to OL. Then SN the length of the perpendicular from the point $(-1, 1)$ to the line $x-3y=o$ is equal to 1·4. But OS $=\sqrt{2}$. Hence ON $=0{\cdot}2$.

Also, if ϕ be the angle the given line makes with the axis of x, $\tan\phi=\frac{1}{3}$. $\therefore$ Sin $\phi=\frac{1}{\sqrt{10}}$, cos $\phi=\frac{3}{\sqrt{10}}$. Hence the co-ordinates of N are 0·12, 0·16.

Now take N as origin and NS, NO as axis. Let P be any point on the required ellipse, and draw PK perpendicular to NO. Then since S is the focus and NO the directrix, we have $SP^2 = e^2$ PK^2. Draw PM perpendicular to NS. Then $SM^2 + MP^2 = SP^2$ $= e^2$ PK^2.

$$\text{Hence } (1{\cdot}4 - x)^2 + y^2 = \tfrac{2}{3}\tfrac{1}{3}\,x^2.$$

Therefore the equation of the ellipse, referred to NS, NO as axis is

$$11x^2 + 36y^2 - 100{\cdot}8x + 70{\cdot}56 = 0 \quad . \quad . \quad . \quad . \quad (3.)$$

If θ denote the angle the original axis of x makes with the new axis NS, then $\theta = -(90 + \phi)$. Hence we have $\cos\theta = -\frac{1}{\sqrt{10}}$, $\sin\theta = -\frac{3}{\sqrt{10}}$.

Transforming (3) to axes through N parallel to the original axes, the equation becomes

$$11\,(-\tfrac{1}{\sqrt{10}}\,x + \tfrac{3}{\sqrt{10}}\,y)^2 + 36\,(-\tfrac{3}{\sqrt{10}}\,x - \tfrac{1}{\sqrt{10}}\,y) + 100{\cdot}8\,(-\tfrac{1}{\sqrt{10}}\,x + \tfrac{3}{\sqrt{10}}\,y) + 70{\cdot}56 = 0.$$

And this reduces to

$$20x^2 + 24\,xy + 27\,y^2 + 80{\cdot}64\,x - 60{\cdot}48\,y + 70{\cdot}56 = 0.$$

Finally, transforming to the original axes through O, the equation becomes

$$20\,(x - 0{\cdot}12)^2 + 24\,(x - 0{\cdot}12)\,(y - 0{\cdot}16) + 27\,(y - 0{\cdot}16 + 80{\cdot}64\,(x - 0{\cdot}12) - 60{\cdot}48\,(y - 0{\cdot}16) + 70{\cdot}56 = 0.$$

And this reduces to

$$20\,x^2 + 24\,xy + 27\,y^2 + 72\,(x - y + 1) = 0.$$

Excelsior.—A rod AB of length $2a$ is revolving uniformly about its extremity A at the rate of n revolutions per second. The end B carries a wheel of radius a, whose plane coincides with the plane of revolution of the rod, and which is rotating at the rate of $2n$ revolutions per second. Determine the speed at which a point C on the rim is travelling when BC is perpendicular to AB. Determine also the instantaneous centre of the wheel.

(Tutorial Dynamics.)

Suppose the motion in both cases to be anti-clockwise. The linear velocity of B relative to A is $2a \,.\, n \,.\, 2\pi$; that of C relative to B is $a \,.\, 2n \,.\, 2\pi$. The directions of these velocities being at right angles to one another, the resultant velocity is given by $\sqrt{[(2a \,.\, n \,.\, 2\pi)^2 + (a \,.\, 2n \,.\, 2\pi)^2]}$, that is by $4\pi na \,.\, \sqrt{2}$.

The point C is moving along a line inclined at an angle of 135° to BC. Hence the instantaneous centre is in a line making an angle of 225° with BC. Hence the instantaneous centre in a

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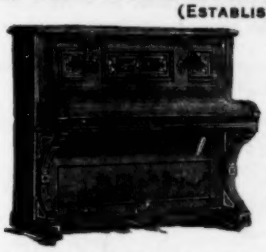

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line passing through C and the middle point of AB. Again B is moving at right angles to AB. Therefore the instantaneous centre is in AB. Hence the middle point of AB is the instantaneous centre of the wheel.

Jacobus.—Two equal particles in a smooth circular tube (whose plane is vertical and whose radius is r) are connected by a string of length equal to one quarter of the circumference. The particles are originally at rest with the upper particle at the highest point of the tube. In the motion which ensues, find (i.) the position of the lower particle when the string slackens, and (ii.) the velocity with which the lower particle reaches the lowest point of the tube.

(Tutorial Dynamics.)

Let θ be the angle which the radius through the upper particle makes with the horizontal at any instant before the string slackens, and let T be the tension of the string at the same instant. Then the acceleration of the upper particle along the curve is $\frac{T}{W}g + g\cos\theta$ where W is the weight of the particle. Similarly the acceleration of the lower particle along the curve is $-\frac{T}{W}g + g\sin\theta$. But these accelerations are equal to one another, therefore

$$\frac{T}{W}g + g\cos\theta = -\frac{T}{W}g + g\sin\theta \quad . \quad . \quad . \quad . \quad . \quad (1).$$

But at the instant at which the string slackens T becomes zero. Then (1) reduces to

$$g\cos\theta = g\sin\theta.$$

Hence we have $\tan\theta = 1$.

It follows, therefore, that when the string slackens either particle has moved through 45° of the arc of the circle.

The centre of gravity of the system is at the middle point of the straight line joining the particles. It is readily seen from the foregoing that when the string slackens the centre of gravity will have fallen through a vertical height equal to half the radius. Hence the work done by gravity on the system is equal to $2mg\frac{r}{2}$, where m is the mass of either particle. Let u be the velocity of either particle at the instant the string slackens. Then the kinetic energy of the system is $\frac{1}{2}\cdot 2mu^2$.

Therefore $\frac{1}{2}\cdot 2mu^2 = 2mg\frac{r}{2}$.

Hence we have $u^2 = gr$.

Let v be the velocity with which the lower particle reaches the lowest point of the curve. Then we have $v^2 = u^2 + 2gh$, where h is the height of the particle above the lowest point of the curve at the instant at which the string begins to slacken. From the first part of the answer it is easily seen that $h = r - r\sin\theta = r(1 - \sin\theta)$ where $\theta = 45°$. Hence

$$h = \left(1 - \frac{1}{\sqrt{2}}\right)r = \frac{2-\sqrt{2}}{2}\cdot r.$$

$$\therefore\ v^2 = u^2 + 2g\cdot\frac{2-\sqrt{2}}{2}\cdot r.$$

But we have seen that $u^2 = gr$.

$$\therefore\ v^2 = gr + g(2-\sqrt{2})r.$$

Hence $v = \sqrt{\{(3-\sqrt{2})gr\}}$.

Bike.—In what kind of relation do the conics

$$l\beta\gamma + m\gamma\alpha + n\alpha\beta = o,$$
$$l\alpha^2 + m\beta^2 + n\gamma^2 = o,$$
$$\beta\gamma = \kappa\alpha^2,$$

respectively, stand to the fundamental triangles? Give reasons for your answer.

Find the condition that the last written equation may represent a circle. (B. Sc., 1903.)

For the relations between the given conics and the fundamental triangles see under *Trilinears* in any standard work on *Conic Sections*; for example, see Charles Smith's *Conic Sections*, §§ 275, 282, and 284.

To find the condition that the equation

$$\kappa\alpha^2 - \beta\gamma = o$$

may represent a circle, we may follow the method of Charles Smith's *Conic Sections*, § 272, and compare the equation

$$\kappa\alpha^2 - \beta\gamma = o \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

with the equation of the circle

$$a\beta\gamma + b\gamma\alpha + c\alpha\beta + (l\alpha + m\beta + n\gamma)(a\alpha + b\beta + c\gamma) = o \quad . \quad (2).$$

Now if (1) and (2) represent the same curve, we must have for some value of λ

$$\lambda\kappa = la, \text{ and } \lambda(-1) = a + mb + nc.$$

Further, the coefficients of the terms in (2) involving β^2, γ^2, $\alpha\beta$ and $\gamma\alpha$ must each be zero.

Therefore $mb = o$, $nc = o$, $b + le + na = o$, $c + lb + ma = o$. Hence $m = o = n$; and $l = -\frac{b}{c} = -\frac{c}{b}$.

Therefore $b = c$ and $l = (-1)$.

But since $m = o = n$ we have $\lambda(-1) = a$. Therefore $\lambda = (-a)$.

Hence the equation $\lambda\kappa = la$ becomes $(-a)\kappa = (-1)a$.

Therefore $\kappa = 1$.

Hence the condition that the equation

$$\beta\gamma = \kappa\alpha^2$$

may represent a circle is that $\kappa = 1$.

Arum.—Rationalise the equation $\sqrt{y} = \sqrt{x} + \sqrt{(x-1)}$ and show that all the values of x and y which simultaneously satisfy it form part of the solutions of $x = (y+1)^2/4y$. Draw the graph of the latter curve, and indicate upon it that portion which corresponds to those solutions of the first equation in which y is positive.

From the given equation

$$\sqrt{y} = \sqrt{x} + \sqrt{(x-1)} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

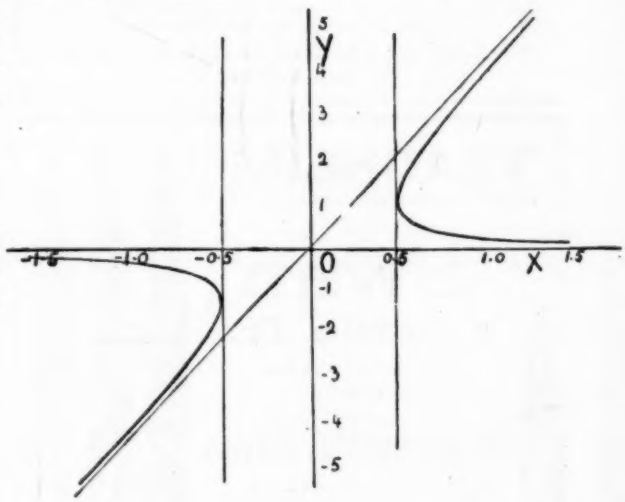
we have $\sqrt{y} - \sqrt{x} = \sqrt{x-1}$.

On squaring we obtain $y + x - 2\sqrt{xy} = x - 1$.

$$\therefore\ 2\sqrt{xy} = y + 1.$$

$$\therefore\ x = (y+1)^2/4y \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2).$$

If x_1, y_1 be any pair of values of x, y which simultaneously satisfy equation (1), it is clear from the above that x_1, y_1 will also satisfy equation (2).



Before drawing the graph of equation (2), we may simplify the equation by transforming it to parallel axes through the point (0·5, 0).

Equation (2) then becomes

$$x = \frac{y^2+1}{4y} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3).$$

From this we have $\frac{dy}{dx} = \frac{4y^2}{y^2-1}$.

Hence $\frac{dy}{dx} = \infty$ when $y = \pm 1$.

The corresponding values of x being $\pm\frac{1}{2}$, we see that the ordinates at $x = \frac{1}{2}$, and $x = -\frac{1}{2}$ are tangents to the curve.

Again, if we write $y = mx$ in equation (3) we have $m(4-m) = \frac{1}{x^2}$. Hence the axis of x and the line $y = 4x$ are asymptotes.

Further, if we write $-x$ for x and $-y$ for y in equation (3), the

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equation does not change. Hence the curve is symmetrical in opposite quadrants.

From equation (3) we obtain the following corresponding values of x and y:—

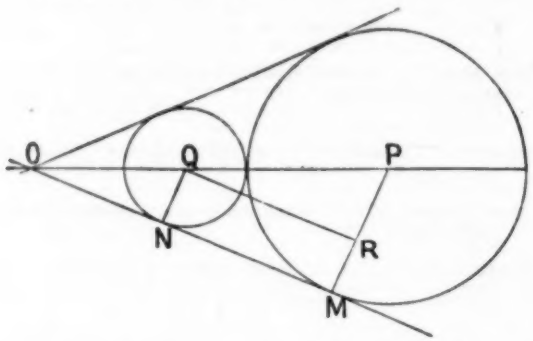
x	0·5	1·0	1·5	. . . .	∞
y	1·0	$2\pm\sqrt{3}$	$3\pm2\sqrt{2}$	. . . .	0

Also we note that for values of x between $-0{\cdot}5$ and $0{\cdot}5$ there are no real values of y. Hence the graph has the form shown in the figure. The right-hand branch is the portion which corresponds to those solutions of the first equation in which y is positive.

W. H.—Two circles of radii a, b, touch each other externally; θ is the angle contained by the common tangents to these circles. Prove that

$$\sin\theta=\frac{4(a-b)\sqrt{ab}}{(a+b)^2}.$$

(Advanced Mathematics, London Matric., January 1904.)



Let P and Q be the centres of the given circles, and let O be the intersection of their direct common tangents. Then by a well-known theorem O, P, and Q are in the same straight line. Also PQ passes through the point of contact of the circles. Let M, N be the points of contact of one of the common tangents. Join PM, ON. From Q draw QR parallel to MN and cutting PM in R. Then $\angle PQR=\angle POM=\frac{1}{2}\theta$; and $\angle PRQ=\angle PMO=$ a right angle.

$$\therefore\ \frac{RP}{PQ}=\sin\frac{\theta}{2}.$$

But $RP=a-b$ and $PQ=a+b$.

$$\therefore\ \sin\frac{\theta}{2}=\frac{a-b}{a+b}.$$

$$\text{Now } \cos^2\frac{\theta}{2}=1-\sin^2\frac{\theta}{2}=1-\frac{(a-b)^2}{(a+b)^2}=\frac{4ab}{(a+b)^2}$$

$$\therefore\ \cos\frac{\theta}{2}=\frac{2\sqrt{ab}}{a+b}.$$

$$\text{Sin }\theta=2\sin\frac{\theta}{2}\cos\frac{\theta}{2}=\frac{2(a-b)}{a+b}\cdot\frac{2\sqrt{ab}}{a+b}=\frac{4(a-b)\sqrt{ab}}{(a+b)^2}.$$

Inter.—Calculate the horse-power required to drive a motor car weighing one ton up an incline of one in 14 at 24 miles per hour, assuming it to reach the same velocity when running freely down this incline.

(Inter. Science, London, 1902.)

Since the car just reaches the speed of 24 miles per hour when running freely down the incline, the resistance at this speed must just be equal to the accelerating force due to gravity, that is to a force of $\frac{2240}{14}$ lbs., or 160 lbs. It follows, therefore, that when the car is ascending the incline with the given velocity, the resistance, together with the retarding force due to gravity, will amount to 320 lbs. The distance described in one minute is

$$\frac{24\times3\times1760}{60}\text{ feet.}$$

Hence the work done per minute is $\frac{24\times3\times1760}{60}\times320$ foot pounds. The horse-power required is therefore

$$\frac{24\times3\times1760}{60}\times\frac{320}{33000}$$

$$=20{\cdot}48\text{ horse-power.}$$

Name?—The test in French or German at the final B.Sc. for *Internal* Students has been confined to translation only. We imagine, therefore, that it is not very likely that questions in Grammar will be set at the Intermediate Examination in Science for External Students.

Caliga.—Show that

$$2\tan^{-1}\left(\sqrt{\frac{a-b}{a+b}}\tan\frac{x}{2}\right)=\cos^{-1}\frac{b+a\cos x}{a+b\cos x}.$$

(Todhunter's *Trigonometry*, Miscellaneous Examples.)

$$\text{Let } y=2\tan^{-1}\left(\sqrt{\frac{a-b}{a+b}}\tan\frac{x}{2}\right).$$

$$\text{Then } \tan^2\frac{y}{2}=\frac{a-b}{a+b}\tan^2\frac{x}{2}.$$

$$\therefore\ 1+\tan^2\frac{y}{2}=1+\frac{a-b}{a+b}\tan^2\frac{x}{2}.$$

$$\therefore\ \frac{1}{\cos^2\frac{y}{2}}=\frac{(a+b)\cos^2\frac{x}{2}+(a-b)\sin^2\frac{x}{2}}{(a+b)\cos^2\frac{x}{2}}.$$

$$\therefore\ \cos^2\frac{y}{2}=\frac{(a+b)\cos^2\frac{x}{2}}{a+b\cos x}.$$

$$\therefore\ 2\cos^2\frac{y}{2}-1=\frac{2(a+b)\cos^2\frac{x}{2}}{a+b\cos x}-1.$$

$$\therefore\ \cos y=\frac{2(a+b)\cos^2\frac{x}{2}-a-b\cos x}{a+b\cos x}.$$

$$=\frac{2(a+b)\cos^2\frac{x}{2}-b(\cos^2x-\sin^2x)-a}{a+b\cos x}.$$

$$=\frac{b+a(2\cos^2\frac{x}{2}-1)}{a+b\cos x}.$$

$$=\frac{b+a\cos x}{a+b\cos x}.$$

$$\therefore\ y=\cos^{-1}\frac{b+a\cos x}{a+b\cos x}.$$

$$\therefore\ 2\tan^{-1}\left(\frac{a-b}{a+b}\tan\frac{x}{2}\right)=\cos^{-1}\frac{b+a\cos x}{a+b\cos x}.$$

Engineer.—If $x=a\sin pt+b\cos pt$ for any value of t where a, b, p are mere numbers, show that this is the same as

$$x=A\sin(pt+e)$$

if A and e are properly evaluated.

The given equation $x=a\sin pt+b\cos pt$, may be written $x=\sqrt{a^2+b^2}\left(\frac{a}{\sqrt{a^2+b^2}}\sin pt+\frac{b}{\sqrt{a^2+b^2}}\cos pt\right)$, since we do not alter the value of the right-hand side by multiplying and dividing by $\sqrt{a^2+b^2}$.

Now, since $\left(\frac{a}{\sqrt{a^2+b^2}}\right)^2+\left(\frac{b}{\sqrt{a^2+b^2}}\right)^2=1$, and for any angle θ, $\sin^2\theta+\cos^2\theta=1$, it follows that for *some* angle e (say), we must have $\frac{a}{\sqrt{a^2+b^2}}=\cos e$, $\frac{b}{\sqrt{a^2+b^2}}=\sin e$.

Hence $x=\sqrt{a^2+b^2}(\sin pt\cos e+\cos pt\sin e)$.

$\therefore\ x=A\sin(pt+e)$,

where $A=\sqrt{a^2+b^2}$ and $e=\tan^{-1}\frac{b}{a}$.

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We have received the following letter from one of our correspondents in New Zealand. As we are anxious to help our readers, we will, if possible, arrange to give the addresses of publishers in future. As to the price, we think full particulars can usually be found in the advertisement columns of the journal.

NEW ZEALAND,
February 14, 1905.

THE EDITOR,
Practical Teacher.

DEAR SIR,—As a subscriber to your decidedly useful magazine I have derived much benefit from your columns devoted to criticisms of books newly published. In fact, many of the books now in use in my class were obtained from reading your criticisms.

There is one thing, however, that is against us in the colonies, viz., we cannot find the addresses of many of the publishers you mention. For example, I wrote to the American Book Company and to Rivingtons, and both letters were returned to me through the dead letter office, as the only address I could put was London. Would it be too much to ask you to give me, in the *Practical Teacher* Answers to Correspondents' Column, under the pen-name of say, N. Z. (*i.e.* I am to be N. Z.), the addresses of the following firms: American Book Company, Rivingtons, Indian Press, Ginn & Co., Macdougall's Educational Company, T. C. & E. C. Jack.

By means of your journal I have got into correspondence with several of the big English publishing firms, to our mutual advantage.

A person living in London can have no idea how hard it is here to keep up with the times as regards latest text-books. I can now say I am fairly abreast of them, but only owing to direct correspondence with publishers, but it is awkward when one's letters get into the dead letter office. Our colonial firms do not stock new books on chance, hence we do not see the latest unless we send home. The big firms, like Macmillans, Blackie, Blackwood, Allmans, Ginn, G. G. Harrap, Longmans, Bell, and others have been most courteous to me, and in many cases I have been able to give them an order.

Another point is that you do not mention the price in your criticisms, but perhaps that is one of your rules.

I myself am in charge of the Secondary Department of the Masterton District High School.

Thanking you in anticipation of favours mentioned, and with best wishes,—I remain, faithfully yours, N. Z.

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